# The Orchadian

Volume 16, Number 12 www.anos.org.au June 2011

## Official Journal of the Australasian Native Orchid Society

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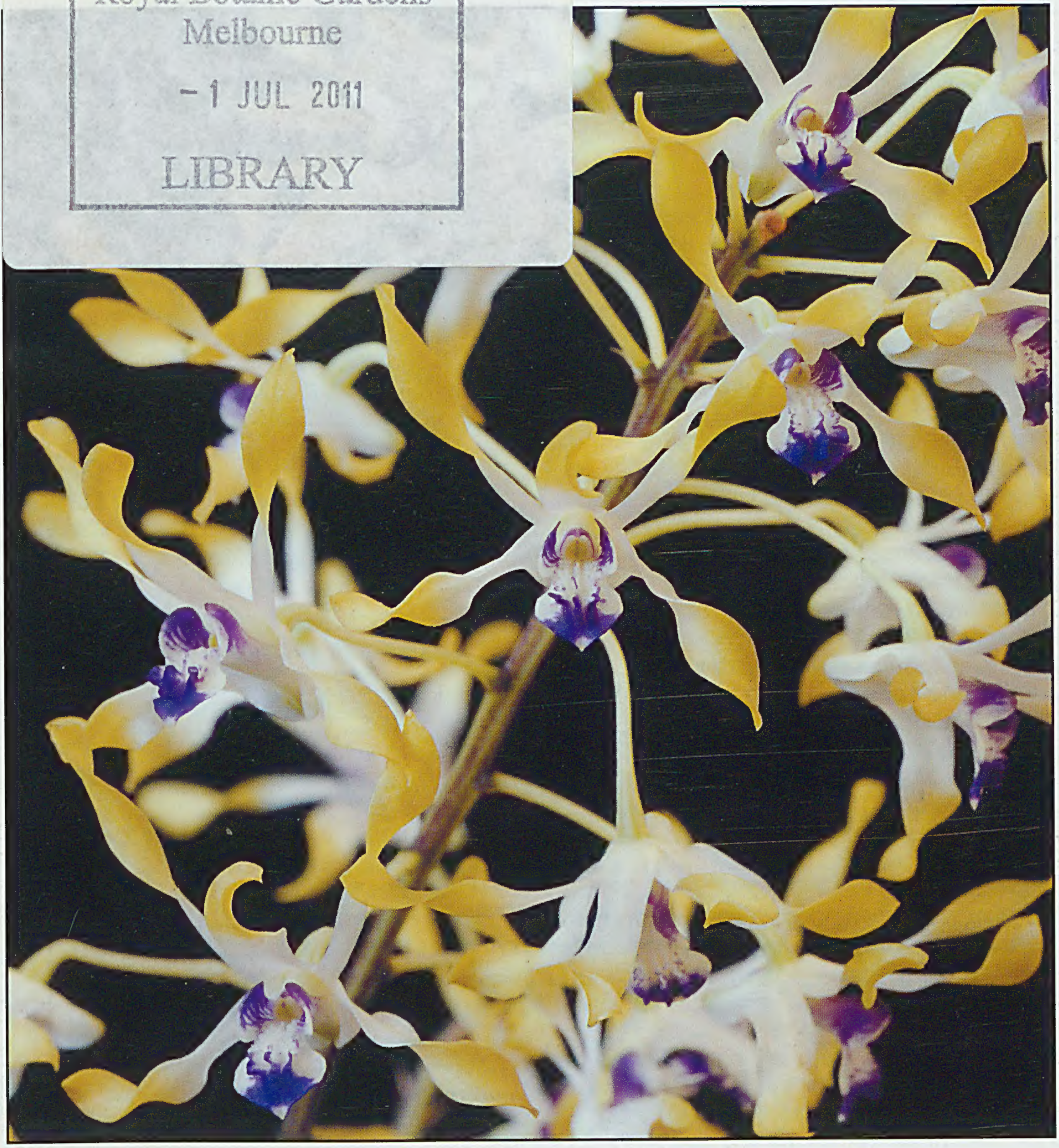

*Dendrobium canaliculatum* Photo William Dobson

# *The Orchadian*

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# President's Report

ANOS Kabi Group has advised that they are happy to host the 2013 ANOS Conference, further details will be advised. This is wonderful news and I am sure that they will strive to emulate the success of other Conferences held to date.

The cold weather has arrived and with Winter approaching, no continual rains here in WA, having had only about 50 ml to date this year, water restrictions are in force, and hopefully we will eventually receive some soon.

Most growers will have noticed 'spike' initiation, it appears as if it will be good flowering season for *Dendrobium speciosum*, and exciting times are here with many seedlings also showing promise. My first focus at any Show is to make my way over to the section that displays the Seedling Classes to see the new and exciting Hybrids.
The new ANOS Hybrid Booklet has finally arrived from the printers, and details will be in this issue of The Orchadian.

The AGM will be held in Kempsey at the Kempsey Heights Bowling Club, commencing at 4.00pm on Saturday the 3rd of September.

The address is 10 Polwood Street, Kempsey. This is the same weekend as the Kempsey Speciosum Spectacular organised by Ted Walmsley. Having attended last year for the first time, this is one Show you should not miss, the quality of orchids is second to none.
All positions will be declared vacant, and hopefully Members will place their name forward for all positions on the ANOS Council.
Kind Regards,

Rick Winch
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PS.
Once again if any Member would like to contact me, please feel free to call or email.

# EDITORIAL

This issue overviews *Dendrobium canaliculatum.* It demonstrates the variability of one species and how easy it is to argue for and against splitting the species. This seems to be a common problem in many *Dendrobium* species.

The Advisory Sub-Committee on Orchid Hybrid Registration (AsCOHR) (RHS)will consider the nomenclature of *Dendrobium* and other genera included in Volume 6 of *Genera Orchidacearum* during 2012 prior to making changes to the registration of orchid hybrids.

I hope to publish more articles on *Dendrobium* nomenclature over the next few issues.

I will be doing more to source articles on Australian Native Hybrids. Hybrids continue to be under represented in The Orchadian.

I have noticed that our native hybrids orchids are not promoted or seen overseas. Much of what is grown are poor examples. Publication of more articles on hybrids in THe Orchadian may promote more interest overseas.

I believe that it is important that we include the Show dates and intend to increase the coverage of the shows.

I will also ensure that all ANOS awards are published in the future Orchadians

Ian Chalmers Editor

# *Phaius australis* colony saved in Kempsey

Tony Clarke

Through the encouragement of a distinguished Elder of the Dunghutti/Gumbaynggir Nations, the late Aunty Maggie Morris, Booroongen Djugun College (B.D.C.)'s Natural Resources Unit located a small colony (17 plants) of *Phaius australis* in the Kempsey area.

The Department of Environment, Climate Change Energy and Water (D.E.C.C.E.W.) believe this newly located colony to be the southern-most distribution of *Phaius australis*. The nearest known colony to the north is at Yuraygir National Park near Yamba. (*please note work done by John Riley*)

With a grant funded by D.E.C.C.E.W Northern Aboriginal Heritage Region the *Phaius australis* Dunghutti Recovery Project was established by B.D.C. "Custodianship helps ensure there is genetic backup for the in-situ population of 17 plants which are at risk for a variety of reasons", said Gary Morris, C.E.O of B.D.C. As part of the program two plants were removed under D.E.C.C.E.W. license to be kept at separate locations, i.e. Tinonee Orchids and Dark Star Orchids.

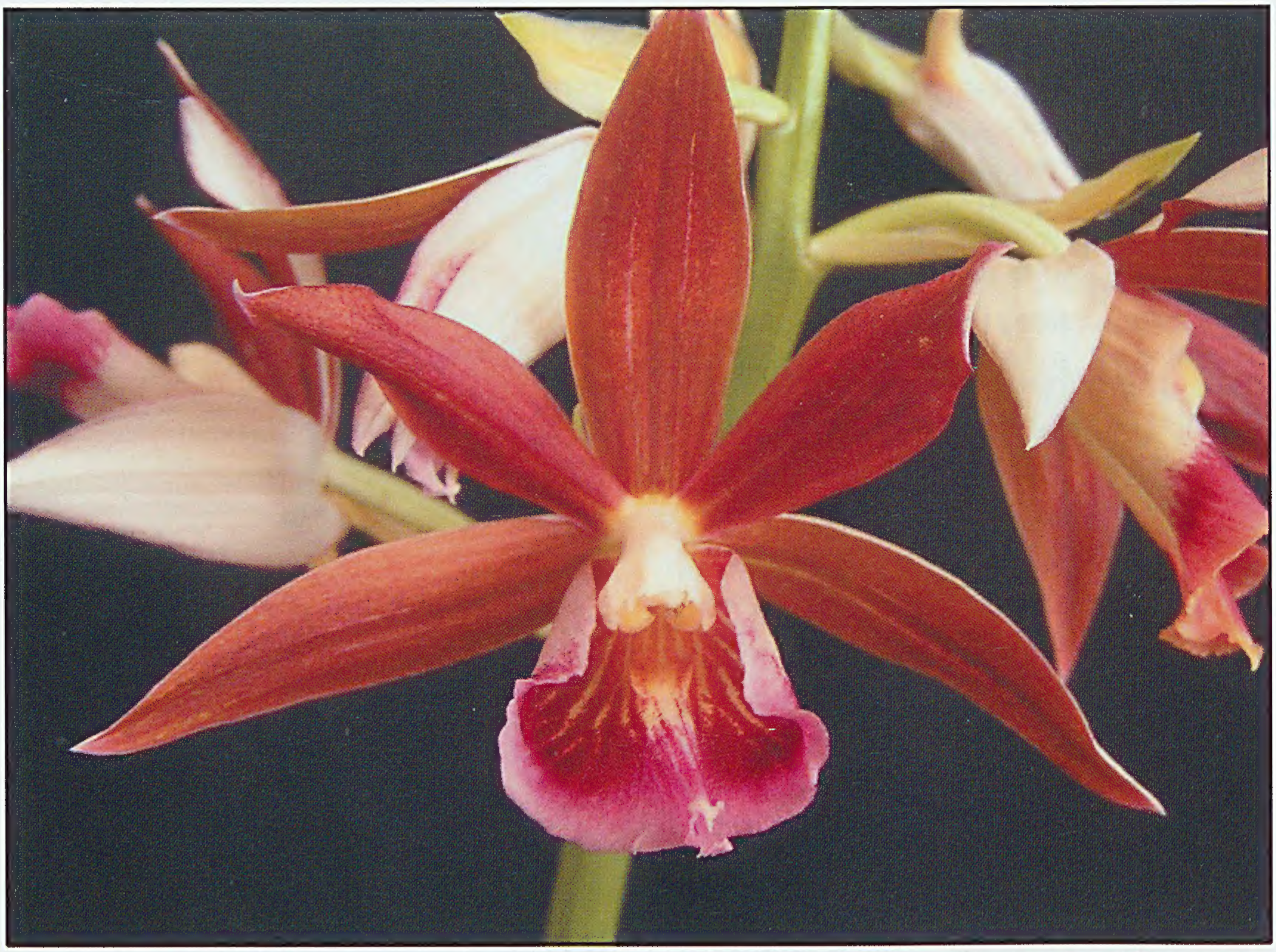
Ray Clement has been successful in nurturing the plant given to him and flowered it this spring. B.D.C. is currently attempting to obtain 2,500 plants from culture and seed, growing to a size where there is a reasonable chance of survival and reintroduction to a suitable habitat. There will also be a number of plants given away to reduce any temptation collectors may have to remove any of the wild plants.

A weed management team selected by the local Aboriginal community has worked at the site (after receiving accredited training in Conservation and Land Management onsite through B.D.C.). The existing population has been cleared of feral weeds which were overgrowing and shading out plants. This has resulted in the plants becoming more vigorous and healthy and in three flowering seasons have gone from one flowering spike for the colony to five spikes of which two set and dispersed seed. "The team are very dedicated to their roles and are doing an excellent job", project coordinator Amie McElroy has said. Cultural Heritage officers from D.E.C.C.E.W trained the team carying out the cultural site surveying.

Ray receiving *Phaius australis*
Photo Ian Chalmers

The plant held by Dark Star Orchids has been pollinated successfully, the seed has been collected and distributed to two laboratories.

*Herbarium records show that the previous southern-most specimen of *Phaius australis* was originally collected by R.D.Fitzgerald on the 28th



*Phaius australis 'Jidaanga'* Photo Ray Clement

of November 1872! at a site just 30km north-west of Kempsey, on or adjacent to the Macleay River (for obvious reasons I am reluctant to give the exact location). This region had been logged and cleared many years ago. (*according to Ted Walmsly*).

H.M.R. Rupp (Guide to the Orchids of New South Wales, 1930) mentions that the southern limit is the Macleay river, although it is possible he obtained this information from herbarium records.

There is much anecdotal "evidence"that Phaius australis has existed, or still does, further south and I include this information here because of the integrity of the correspondents viz.

South of Laurieton (pers. comm. John Riley);

Myall Lakes area (pers. comm. Ray Clement and Denis Sinclair);

South eastern side of Port Stephens (Marjolein Long).

Herbarium records also show that the next closest colony is just south of Coffs Harbour (collected and personally confirmed by John Riley).

## The status of *Phaius tancervilleae*

Most Australian botanists now regard *Phaius tancervilleae* as not being native to Australia (*Phaius tancervilleae* being originally collected from China and submitted to Kew in 1789). *Phaius tancarvilleae* of course does exist in Australia in collections but these plants or their ancestors are thought to have been imported. However to further complicate this issue some authorities from north Queensland maintain that *Phaius tancervilleae* does exist in the wild in Australia.In an attempt to avoid controversy because the object of this article was to promote the excellent work of B.D.C.,it might be better to say that there is there is a *Phaius* that is

*Phaius australis* showing vigour after weeding Photo B.D.C.

distinctive from *Phaius australis* (other than *Phaius pictus*) that is found in North Queensland. Perhaps in time there will be consensus by all of its status.The uncertainy of this has led to these orchids being referred to as the "Southern Swamp Orchid" and the "Northern Swamp Orchid which I think is highly undesirable. Most literature readily available to the public about the *Phaius* found in Australia is written for orchid growers and their source location (from the wild) is often anecdotal and rarely confirmed by photograph or in the accepted manner i.e. by an specimen together with a description,its location, abundance, habit and habitat submitted to a recognised herbarium. Information regarding *Phaius* in-situ is often held by local people and this information is usually (and should be) not readily available.

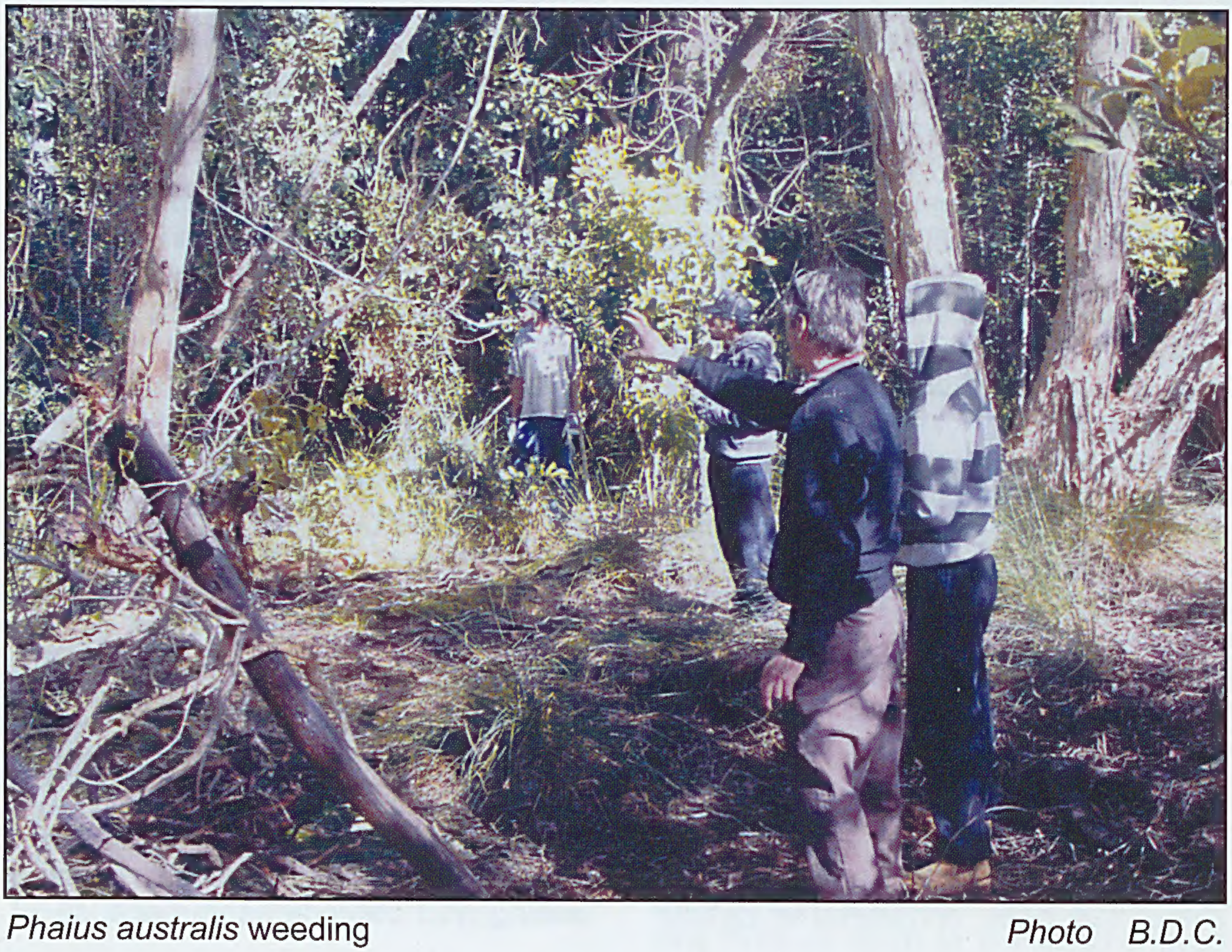
There has been considerable debate surrounding the nomenclature of the genus *Phaius* in Australia. However the current consensus, according to the National Herbarium, is that there are two distinct native species in Australia: *Phaius australis* and *Phaius bernaysii*. These were originally treated as varieties of the species now known as Phaius australis.

**The future of** *Phaius australis* is precarious, and it is now regarded as an endangered species on Part 1 of Schedule 1 of the New South Wales Threatened Species Conservation Act 1995 and the Queensland Nature Conservation Act 1992. There are currently about 14 known populations in New South Wales. Most of these populations have very few plants . The cause of this decline was originally from land clearing by way of logging, pasture creation,draining of "swamps", sand mining and now, probably because of its rarity, illegal collection. We seem to be powerless to stop land clearing. Whilst researching I came across many environmental studies on behalf of governmental bodies such as the R.T.A. In these studies small populations or even single plants were located. There is a possibility that not all *Phaius* plants were located during these studies due to the difficult "terrain" of wetlands. It is even possible that many other wetlands that have not been fully searched may have colonies of *Phaius australis*. It is important that remnant wetlands be preserved and not regarded (as in the past) as wasteland.I recall that the original study for the R.T.A. for the Bulahdelah Bypass stated that there was no flora of significance for the preferred site, and we all know now how wrong that was (not that the revelation of *Rhizanthella slateri* being there mattered anyway).

Some time ago I obtained maps of the Hat Head area which showed extensive *Melaleuca* swamps, but upon going there to go bushwalking I found large canals dug to drain the swamps for agriculture.

*Melaleuca quinquenervia* "broad leaved paperbark" swamps usually (but not exclusively) near the coast seem to be the main habitat for *Phaius australis*. The leaf litter from these trees decomposes in a short time and perhaps the resultant humus is compatible with the mycorrhiza essential for the ongoing development of the *Phaius australis* seedlings after germination.

So for the future survival of *Phaius australis* in the wild it is essential that these *Melaleuca quinquenervia* swamps or wetlands are also preserved and not degraded. About 15 years ago I had the misfortune of seeing sand mining in progress on North Stradbroke Island and this island is known as previously



*Phaius australis* weeding *Photo B.D.C.*

*Phaius australis* in situ *Photo B.D.C.*

having significant populations of *Phaius australis* and *Phaius bernaysii*.One can only hope that all wetlands on North Stradbroke with Phaius populations were identified and preserved.

It is intresting that to the further north *Phaius* can and does exist inland away from typical "swamps". Populations have been found in the Numinbah valley,Carnarvon gorge and the Atherton tablelands. All these populations rely on soaks that have permanent seepage to replenish them. These areas are extremely fragile and one can only hope that they have a guardian such as B.D.C.

It certainly is pleasing to know that Booroongen Djugun College and the local Goori community have instigated and continue to have great interest in the preservation of this colony. A case of the original caretakers of this country still taking care of it.

**Acknowledgements**

I wish to thank Booroongen Djugun Aboriginal Corporation/Booroongen Djugun College for all information of the *Phaius australis* (Dunghutti) Project.
Phil March for the inspiration.
Amie McElroy: Aboriginal Extension Project Officer Booroongen Djugun College for proof reading/protocol.
Peter Bostock, Principal Botanist, Queensland Herbarium, Department of Environment and Resource Management, for herbarium and nomenclatural information.
Ted Walmsley, John Riley, Denis Sinclair, Ray Clement and Marjeloin Long for their help.

On-line Sources:
Australia's Virtual Herbarium http://avh.rbg.vic.gov.au/avh/
Australian Orchid Name Index, dated 13 June 2008: http://www.anbg.gov.au/cpbr/cd-keys/orchidkey/catalogue.html

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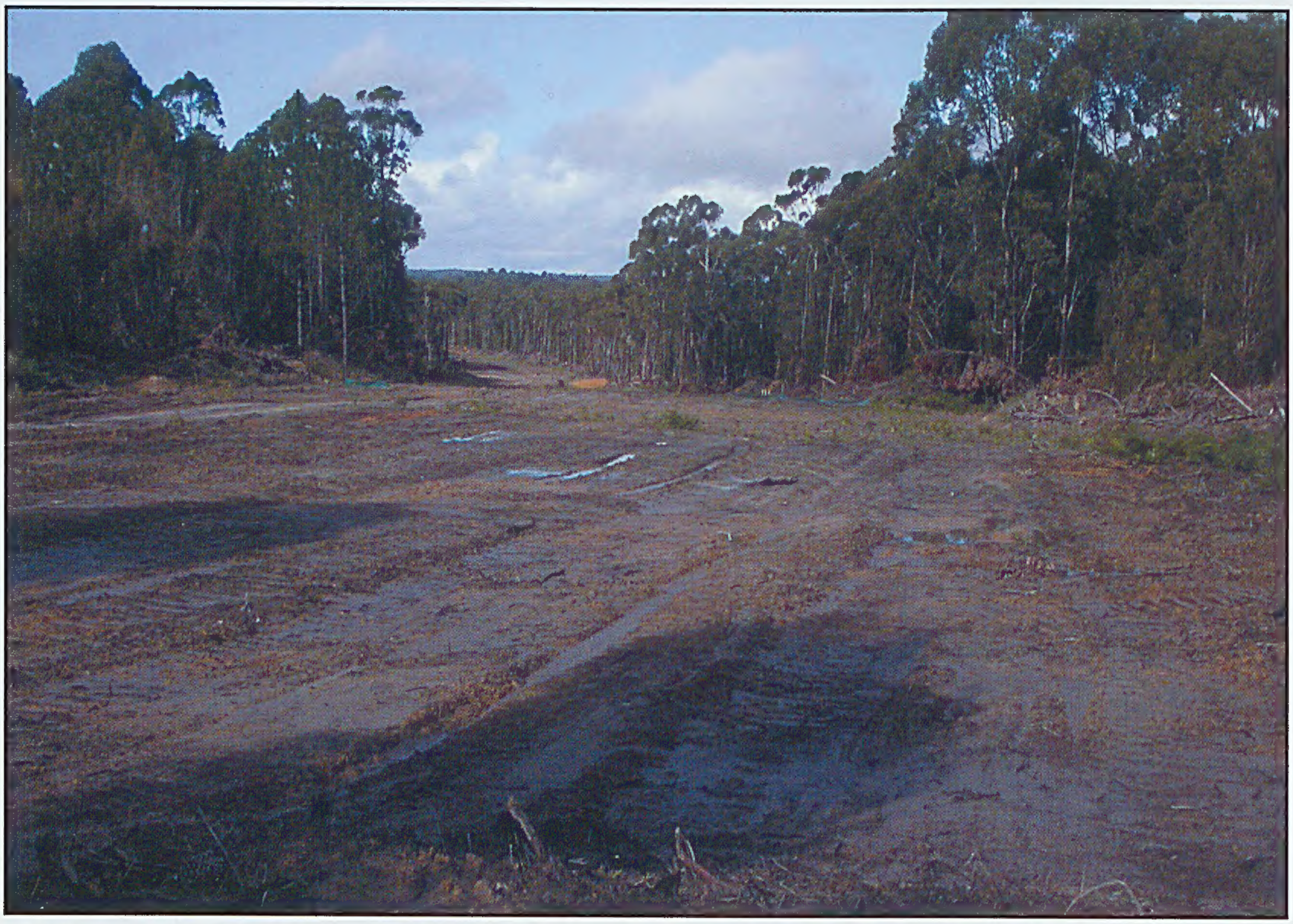
# IT'S THE LITTLE THINGS

Alan W. Stephenson

I have always said to myself that as far as orchid conservation goes and conservation in general, it is not always the major projects which are responsible for environmental damage but frequently the small, almost unnoticeable events which lead to the lessening of environmental values of a specific site and are noticed only after it's too late. Occasionally a contrast is seen where extensive damage is done which will take years to repair. Such events have occurred in my local area in recent months.

One which will almost certainly result in a prosecution is the clearing of a section of bush land, which allegedly began as an access road but later grew into what was thought to be a private airstrip. A section of bush approximately 50 m x 600 m was cleared under the guise of an access road to a property but clearing was so great I thought it was the beginning of a proposed road which would by-pass a village and therefore direct through traffic away from an already congested small main street and business area. The damage to the bush land will be visible for a decade or more and should be a reminder to consult local authorities if a similar destructive event is noticed in your local area. The irony of the event is that the same authority which will prosecute the offender is the same authority which caused damage to the site of a rare orchid only two years ago but somehow escaped prosecution. No exact location will be given for the current damage except that the same area was once the habitat of *Arachnorchis tessellata*



Airstrip clearing

(*Caladenia tessellata*) and later became what I have previously described as a failed Pine Forest plantation.

Another event which caused me to become even more angry than normal was the lopping of a large shrub containing two plants of *Sarcochilus falcatus* and the largest specimen of *Plectorrhiza tridentata* which I have seen. The *Sarco. falcatus* were mature plants which have flowered well for many years and the *P. tridentata* measured 500 mm in 1999. I am at a loss to understand why the shrub was cut down, as it was not a threat to vehicles and the plants *in situ* were destroyed when the shrub was butchered, so removal of the orchids was not a factor. The shrub containing the plants was on the verge of a little used but prominent track and only metres from a busy main mountain road. To add insult to injury some branches of a larger tree less than 50 metres away across the intersection were also removed. One limb containing three plants of *Sarco. falcatus* and two plants of *Dockrillia pugioniformis* were left to rot on the ground and again orchid collection was not a factor. These events happened several months apart and my only assessment is that the larger tree was lopped to prevent snagging by the vertically projecting exhausts of large vehicles, although the road at that point is not suitable for large vehicles and a sign is in place to advise of this. I only noted the latter event when showing an overseas visitor some of our local scenery and the orchids contained within this particular section of a very scenic environment.

Many people in NSW would be aware of the village of Huskisson on the shores of Jervis Bay which is home to the Lady Denman Heritage Museum. A fine group of volunteers run this facility and each year an Environment Fair is organised. This year I was invited to participate and I staged a display which presented photos of most of the threatened species orchids within the area and compared their numbers with well known Australian and some exotic *flora* and *fauna* species, which for some reason get more attention than any native orchid could hope for. As you might surmise, this annoys me intensely and the figures I used were obtained from the Website of the International

Rescued *Sarco. falcatus*

Lady Denman Environment Fair

Union for the Conservation of Nature Red List (IUCN) and were obviously a reality check for many. This display attracted more attention than any I had done at my local A&H Show for the past five years. The figures are listed below.

The code denotes whether the orchid figures given are for the local population (L) , or if the species is endemic (E) to the local area or New South Wales or in one case extinct.

| | | |
|---|---|---|
| Gorilla- | 300,000 | |
| Koala – | 100,000 | |
| Orang-utan – | 70,000 | |
| Polar Bear – | 35,000 | |
| Leather-back Turtle – | 30,000 | |
| Tasmanian Devil – | 20,000 | |
| Rhinoceros – | 17,000 | |
| Spotted Quoll - | 10,000 | |
| Gouldian Finch – | 2,500 | |
| Bengal Tiger – | 2,100 | |
| Eastern Bristle Bird – | 1,800 | |
| Tasmanian Wedge Tail Eagle | 1,000 | |
| Green and Golden Bell Frog – | 1,100 | |
| *Prasophyllum affine* - | 1150 | E |
| *Cryptostylis hunteriana* - | 500 | L |
| *Speculantha vernale* – | 450 | E |
| *Speculantha ventricosa* – | 350 | E |
| *Oligochaetochilus gibbosus* – | 300 | L |
| *Genoplesium baueri* – | 210 | E NSW |
| *Corunastylis vernalis* – | 150 | E |
| *Corybas undulatus* - | 80 | L |
| *Diplodium pulchellum* – | 60 | L |
| *Corunastylis superba* – | 43 | L |
| *Calochilus pulchellus* – | 32 | E |
| *Rhizanthella slateri* – | 5 | L |
| *Diplodium hians* - | Extinct | |

Photos Alan Stephenson
National Conservation Officer
Australasian Native Orchid Society (ANOS)

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**Sun 4th Sept 9am to 2pm**

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# The Many Guises of *Dendrobium canaliculatum* R. Br. (Edited)

Robert P. Reitano

*Dendrobium canaliculatum* R. Br. (Section *Spatulata*) is a variable, clumping epiphyte of northern Australia, some Torres Strait Islands, and Papua New Guinea. It was discovered on the Endeavour River, the locality of the type specimen, on James Cook's 1770s voyage, and was formally described briefly in Latin by Robert Brown in his Prodromus in 1810. Hence, the authority R.Br. after the specific name.

Since then, there have been several attempts to define distinct varieties, all based on limited assessment of the total variation. Dockrill (1969) listed two varieties – *canaliculatum* and *foelshei* (F. Muell.) Rupp and Hunt, from the Northern Territory and northern Western Australia, and noted their similarity and variable flowers. In 1992 he listed four varieties, adding *nigrescens* and *pallidum.* Clements (1981) regarded the above and a third variation, *D. tattonianum* Bateman ex H.G. Reich.b. as three morphologically distinct but closely related species.

The only detailed formal study of variation in *D. canaliculatum* is that of Peter Dobson, in his 1994 M.Sc. thesis "*Geographic variation within the* Dendrobium canaliculatum *(Orchidaceae) species complex'*. He concluded on the basis of morphological study that there is a gradation of variation in *D. canaliculatum*, with little evidence for distinct subgroups.

In 2002 Clements and Jones in the Orchadian proposed a new genus *Cepobaculum*, encompassing *C. canaliculatum*, *C. foelschei*, *C. tattonianum* and other members of Section *Spatulata*.

It is clear that *D. canaliculatum* is a very variable species that is difficult to satisfactorily describe and subclassify when the total distribution is examined. Many poorly accessible areas are yet to be studied.

## Characteristics

*D. canaliculatum* is a species commonly known in Australia as the Tea-Tree or Onion Orchid. Watson Sharp (1970) and Jones (2006) agree that these common names are derived from the fact that it is often found growing on *Melaleuca* species in its native habitat and describe the pseudobulbs as having an elongated onion-shape. The botanical name is derived from the leaf structure, which is thick, nearly cylindrical in cross-section, terete and deeply channelled on the upper-side. The two to six leaves appear from the terminal nodes of the ovoid or fusiform pseudobulb and can reach up to 25 centimetres in length. It often flowers off extremely small plants, with the long, multiple slender racemes appearing from the apical nodes and each raceme bearing up to 50 twisted blooms. The flowers are generally 20 - 25 x 25 - 30mm in size. Sepals and petals are twisted towards a pointed apex. They are approximately similar in length, with sepals measuring 10-15mm in length x 3-4mm in width and petals measuring 13 - 18mm in length x 2.5 - 3mm in width. The labellum is usually white and purple and is between 10 - 13mm long x 7 - 9mm wide. It is tri-lobed with broad lateral lobes that are erect and a mid-lobe usually 4 - 5mm wide, shortly pointed with 3 wavy calli (figure 1) (Jones 2006).

## The Habitat Range

The general habitat is predominately *Melaleuca* woodland and open forests below 500 metres. The species is highly variable as the habitat is widespread

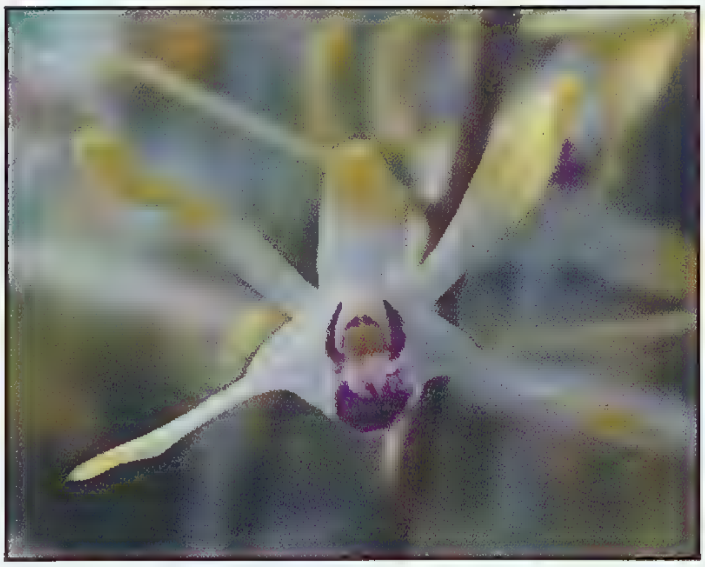

Figure 1. Close-up of *D. canaliculatum* - typical of east-coastal form

to include the northern tropical parts of Western Australia, Northern Territory, north-eastern coastal areas of Queensland, north of Rockhampton, Torres Strait Islands and regions in southern New Guinea (figure 2). Researchers concur that the common host tree is *Melaleuca viridiflora* (figures 3 & 4); however, it grows on a range of *Melaleuca* species, *Tristania* and the freshwater mangrove *Barringtonia* to name a few. *Melaleuca* forests are among the major vegetation types in northern Australia. Although rainfall is variable, it is seasonal. These regions tend to be very wet during the summer monsoonal season, with many low areas becoming inundated with flood waters. During the remainder of the year these regions see little or virtually no rainfall. Therefore, this species thrives in areas which experience two distinctive seasons of wet and warm temperatures and dry with cooler temperatures seldom below 10 degrees Celsius for prolonged periods. Being mindful that climatic conditions are variable within the widespread habitats stated above, this influences variations in growth habit and flower colour. With all these factors in mind, this species is highly intolerant of cold temperatures and high humidity during the cooler months, especially within inland regions away from the coast.

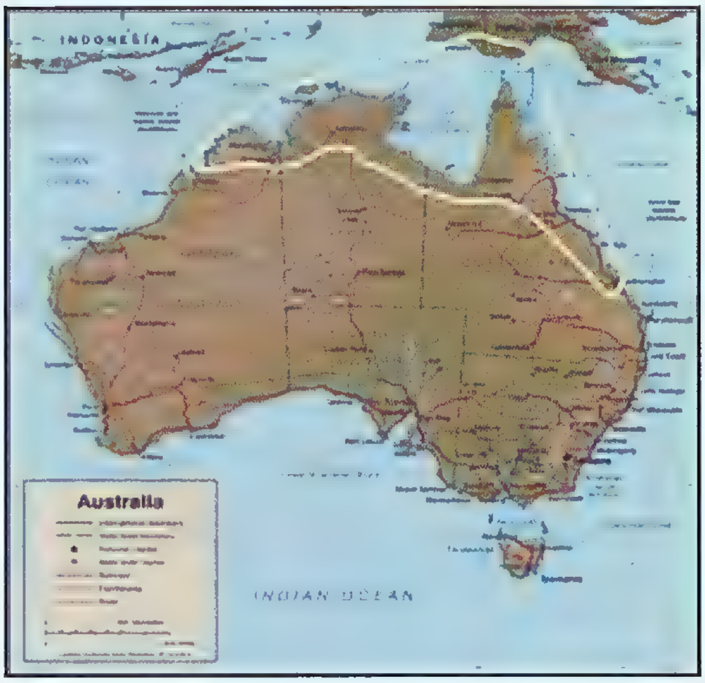

Figure 2. Habitat range of *D. canaliculatum* within Australia, Torres Strait and Papua New Guinea.

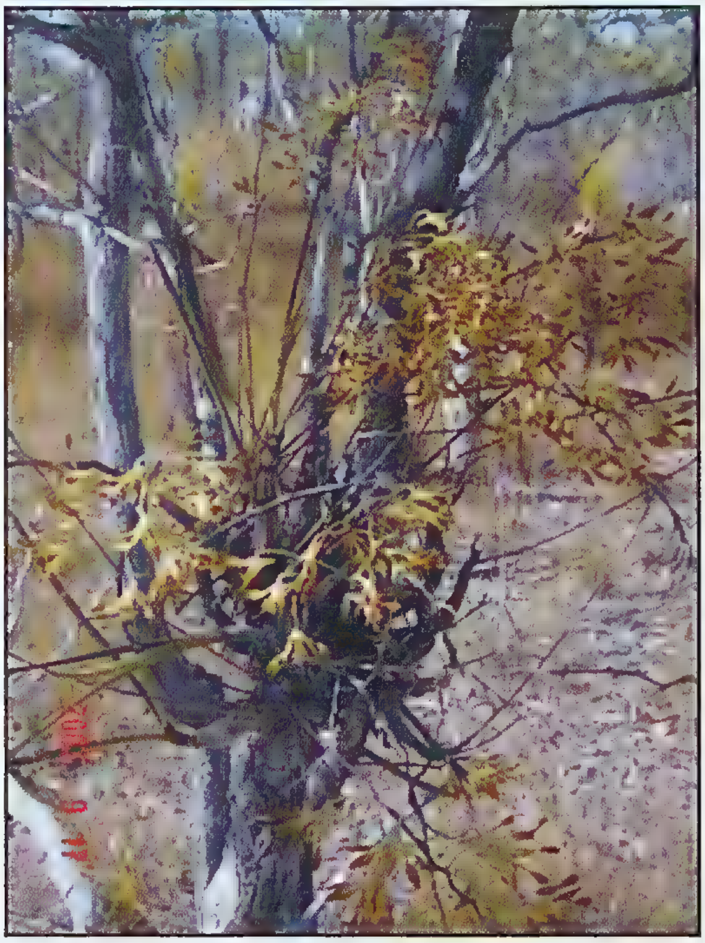

Figure 3. *D. canaliculatum* var. *nigrescens* in situ Lockhart River-Iron Range region.

## Documented Varieties

There appears to be some disparity between writers, regarding the variation of flower colour and inflorescence habit within the documented research. Jones (1988) suggests the flowers are white at

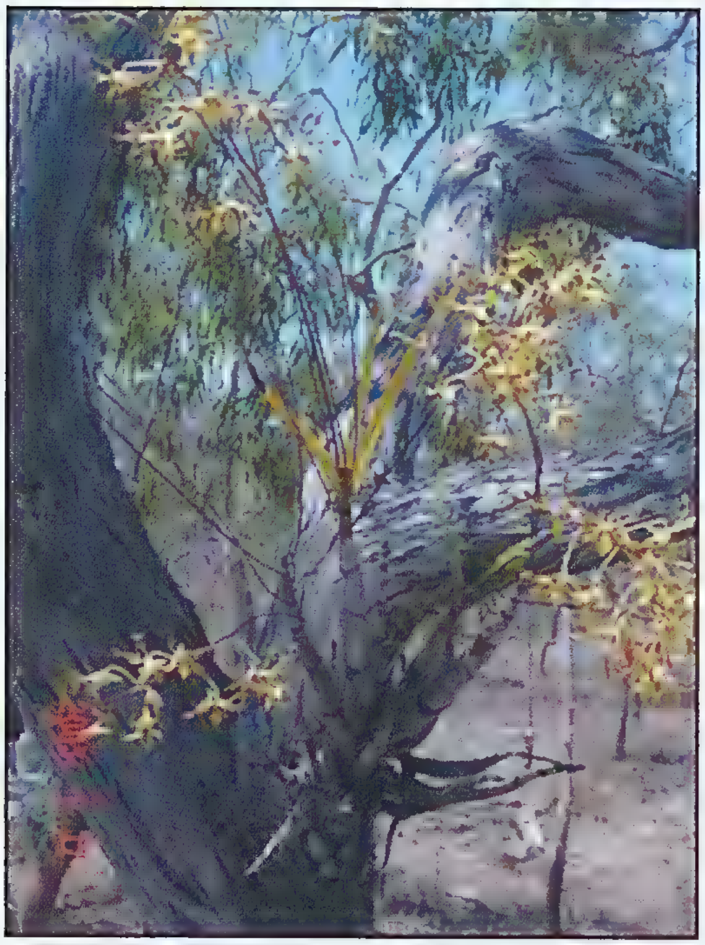

Figure 4. Rough bark of *Melaleuca viridiflora* and natural hybrid specimen on lower branches.

the base, with yellow, pink or brownish colouration towards the tips. He goes further to support the documentation of the following varieties of *D. canaliculatum* var. *canaliculatum*, var. *foelschei*, var. *nigrescens* and var. *pallidum.* It is now considered that *D. canaliculatum* var. *canaliculatum* is the coastal form and the flowers are predominately near-white at the base with varying degrees of yellow on the tips, with the typical purple and white labellum. Lavarack, Harris & Stocker (2006) support this and believe the lighter colour forms originate from the southern reaches of its habitat range and have been regarded by some authorities to be a separate species; *D. tattonianum.*

Furthermore, the darker forms from the northern reaches are considered typical of *D. canaliculatum*. However, they dismiss these differences as being superficial and worthy of recognition as a variety only. In contrast, *D. canaliculatum* var. *foelschei* displays itself differently from the other varieties, as the flowers have a lighter colouring and racemes that possess a drooping habit with the flowers not always opening fully.

Chris Cobb of Edmonton in North Queensland on the 21 December 2009, reports that *D. canaliculatum* var. *nigrescens* grows predominantly in drier inland habitats, which includes areas towards the east coast in its northern reach near Cooktown. He believes it to be the main variety within the Cape York Peninsula and Torres Strait Islands and one that possesses more colour variation including the base colour, which is often cream to yellow in colour compared to the near-white of the central-east coastal form (figure 5). Jones (1988) supports this and adds that it is often found growing with the typical form closer towards the north-eastern coast of Queensland.

Watson Sharp (1970) acknowledges varied flower colour forms, but states they are mostly white, merging into yellow at the ends of the sepals and petals. Lavarack et al (1985) suggested *D. canaliculatum* var. *pallidum* is similar in colour to *D. canaliculatum* var. *nigrescens*, where Jones (1988) believes *D. canaliculatum* var. *pallidum* to possess lighter colouration and sepals that are not normally twisted. Chris Cobb (2009) states the variation extends beyond to include an alba form and an interesting violet form endemic to Badu Island and Horn Island (figures 6 & 7).

## Close Relative and its differentiation

*D. carronii* was once believed to be a pink form of *D. canaliculatum*; however, further research has dispelled this as Lavarack, Harris & Stocker (2006) state that even though the two species are found together on the northern part

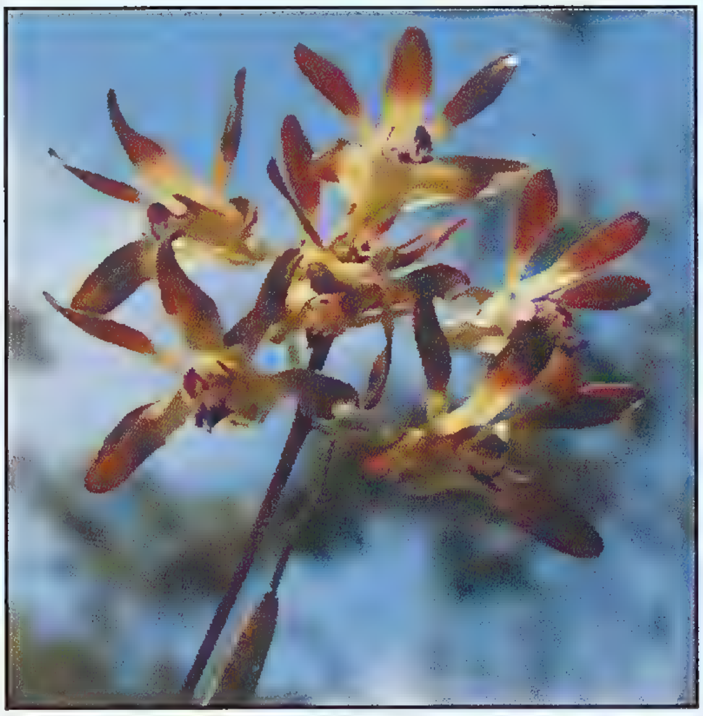

Figure 5. *nigrescens* from Lockhart River - shorter inflorescence, lower flower count and larger flowers.

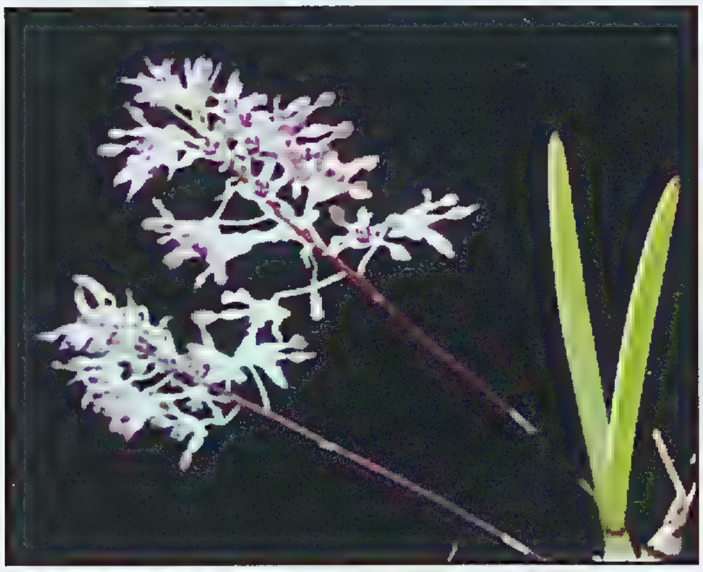

Figure 6. Violet form unique to Badu Island and Horn Island.

of Cape York Peninsula, the islands of Torres Strait and southern New Guinea, there are floral characteristics that differentiate the two. Lavarack and Cribb described *D. carronii* as a separate species in 1985. The colour of the flower is pink with brown and purple markings, with a light base colour and a labellum of greenish yellow. Jones (2006) states a definite difference in segment length, as the lateral sepals are short and triangular, whilst the petals are long, slender and erect (figure 9).

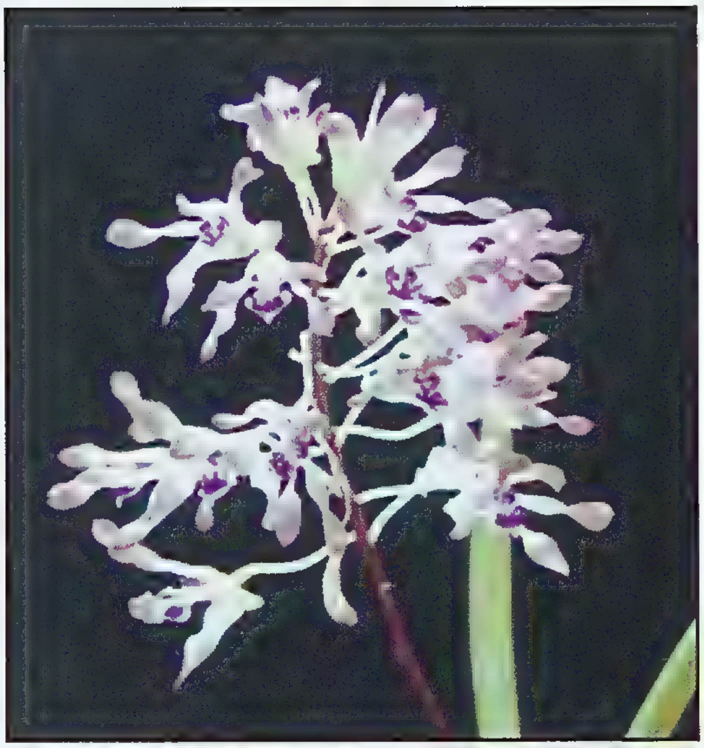

*Figure 7*. Close up of Lilac form.

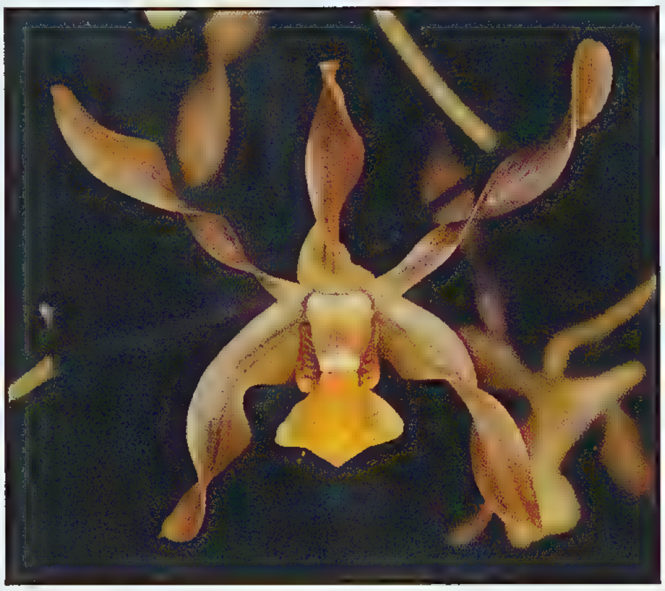

Figure 8. *D. trilamellatum* Photo Bill Dobson

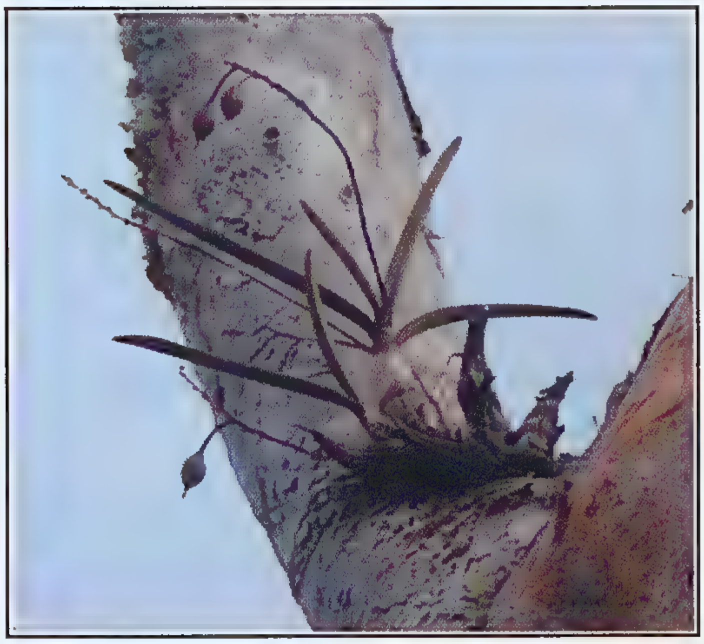

Figure 9. *D. carronii* in situ in pod. Leaf structure is flatter and broader.

## Variation and Location

Cobb (2009) believes that variation often correlates with location and environment. He notes that specimens further inland experiencing definite dry winter-spring seasons and periodically subjected to fire, tend to have pseudobulbs that appear stunted, with shorter inflorescences; as the bark on these host trees is thinner and holds less moisture. With these shorter racemes, the flower count is lower and they tend to be larger and rather bunched (figures 10 – 12). He believes the lower flower count allows the plant to pump more energy into the shorter, less numbered raceme, producing larger individual flowers. There is more variety of colours in the Lockhart River region extending to the top of the McIlwraith Range and Leo Creek, which is east of Coen. These darker forms of *D. canaliculatum* var. *nigrescens* tend to have a cream-yellow base colour. There is a form that exhibits a rather bunched inflorescence of predominantly yellow blooms with very little white colouring, other than what appears in the typical labellum colouration (figure 13). Similarly, an orange form of this variety also appears to have little white colouration except for that in the labellum (figure 14 & 15). It brings one to question whether these could very well be natural inter-varietal hybrids within the Lockhart River region, which boasts such a broad colour variation. The closer one moves to the coast with the increase in moisture, the larger the pseudobulbs and more vigorous the specimen. This increase of moisture sees plants with extended peduncles and plants with increased vigour (figure 16). There appears to be a Mareeba form of *D. canaliculatum* var. nigrescens, which has a white base colour with brown tips to petals and sepals. It still has the typical white and purple labellum. This variation is endemic to Mareeba and areas north of

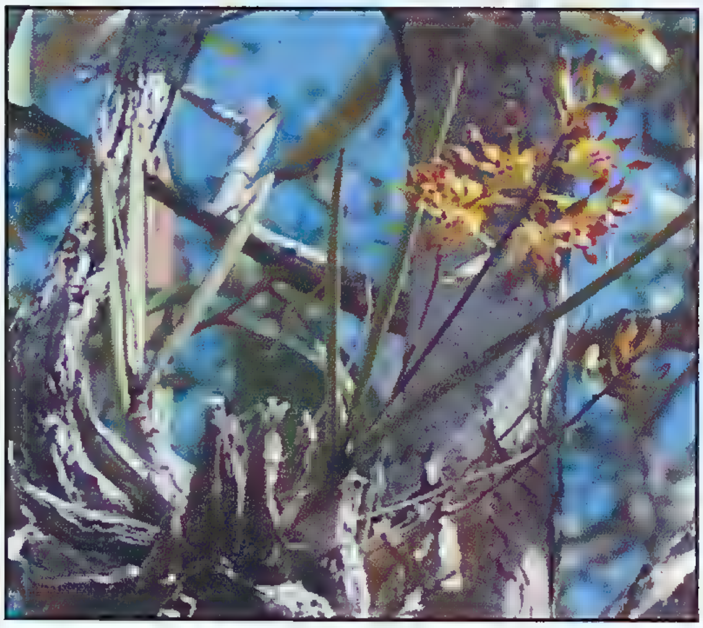

Figure 10. *D. canaliculatum* var. *nigrescens* showing shorter inflorescence and larger flowers.

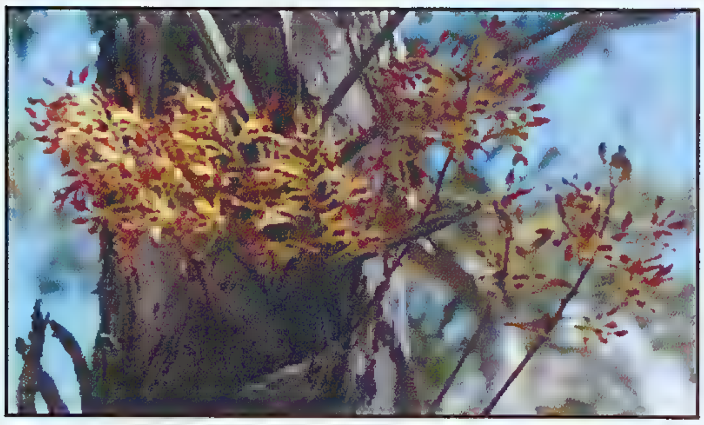

Figure 11. *D. canaliculatum* var. *nigrescens* Red form from Lockhart River-Iron Range region.

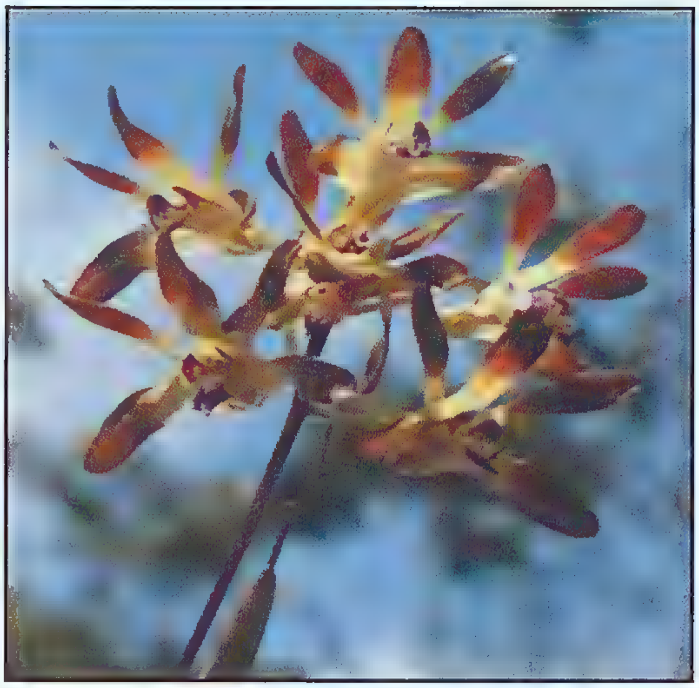

Figure 12. *D. canaliculatum var. nigrescens* from Lockhart River - shorter inflorescence, lower flower count and larger flowers.

this town. As Jones (1988) states that both *D. canaliculatum* var. *canaliculatum* and *D. canaliculatum* var. *nigrescens* grow within this region, supports the possibility that this may also be a natural inter-varietal hybrid between the two. *D. canaliculatum* is pollinated by *Hylaeus* bee species (Adams and Lawson 1993). The *D. canaliculatum* var. *canaliculatum*, which is found on the east coast from Rockhampton to as far north as Cooktown, appears to have increased vigour and multiple racemes from each pseudobulb, which is typical of this form. The higher rainfall and moisture in these coastal regions enables the species to endure full-light conditions, This is particularly evident in the specimens located in the Cardwell region on the east Queensland tropical coast (figures 17 - 19). Cobb (2009) grows his private collection under bright conditions in a 30% shade house with plenty of ventilation (figure 20).

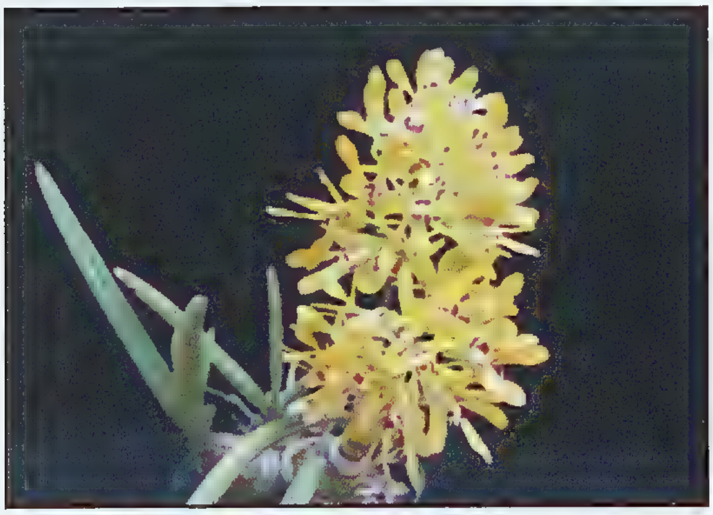

Figure 13. Bunched inflorescence from Lockhart River exhibiting predominantly yellow colouration.

Another variety that is unique to a specific location is the form found in the Weipa area. This variety has the same colouration as the east coast form, but unlike *D. canaliculatum* var. *canaliculatum,* the racemes are almost pendant with smaller flowers that tend to droop and not open fully; much the same as *D. canaliculatum* var. *foelschei* (figure 21). I speculate that this variety takes on characteristics similar to species that have adapted to higher rainfall areas within New Guinea; where the dorsal sepal protects the sexual productive organs from rain. This may be presumptuous as the climatic conditions in Weipa are not as wet as those in New Guinea, where it is common for daily or evening showers. But it certainly leaves one with food for thought as to how this species has adapted to specific habitat

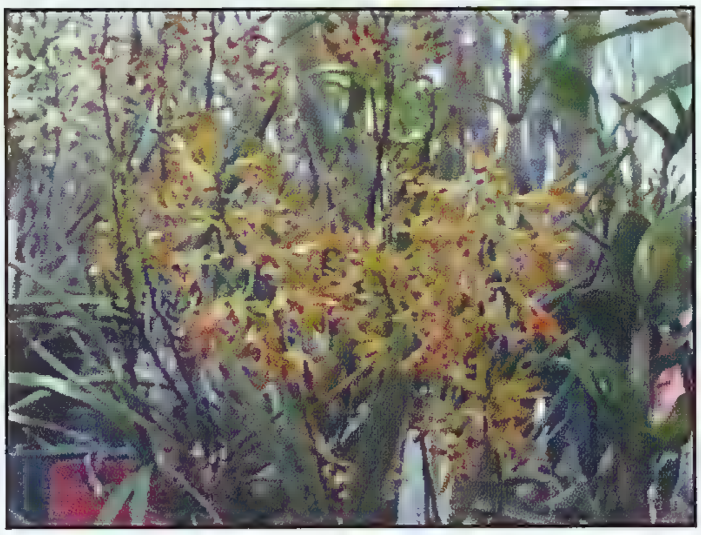

Figure 14. Orange colour form of var. *nigrescens* from the Lockhart River region.

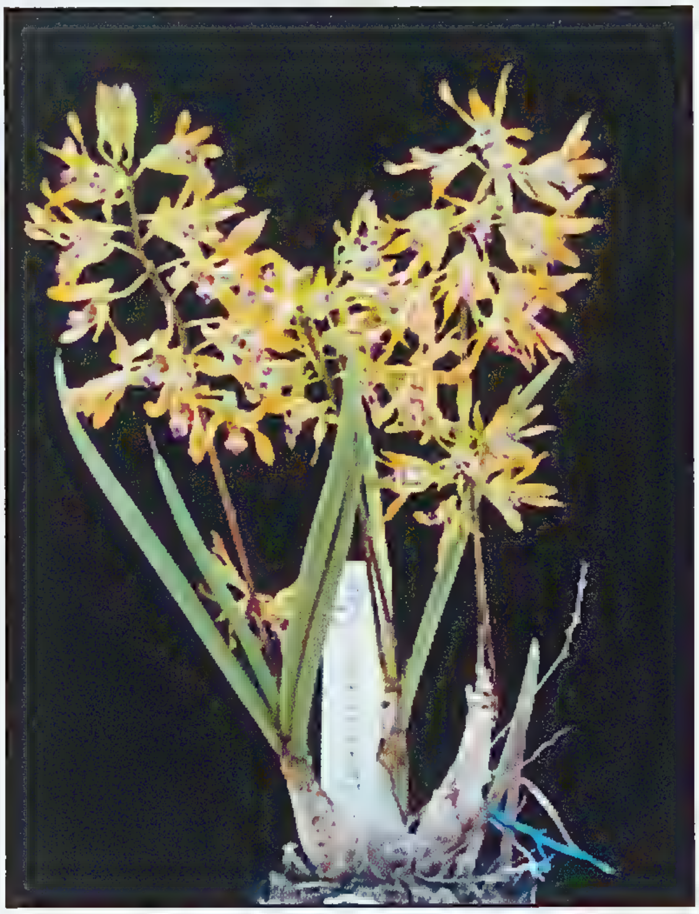

Figure 15. Lockhart River orange form – whole plant view.

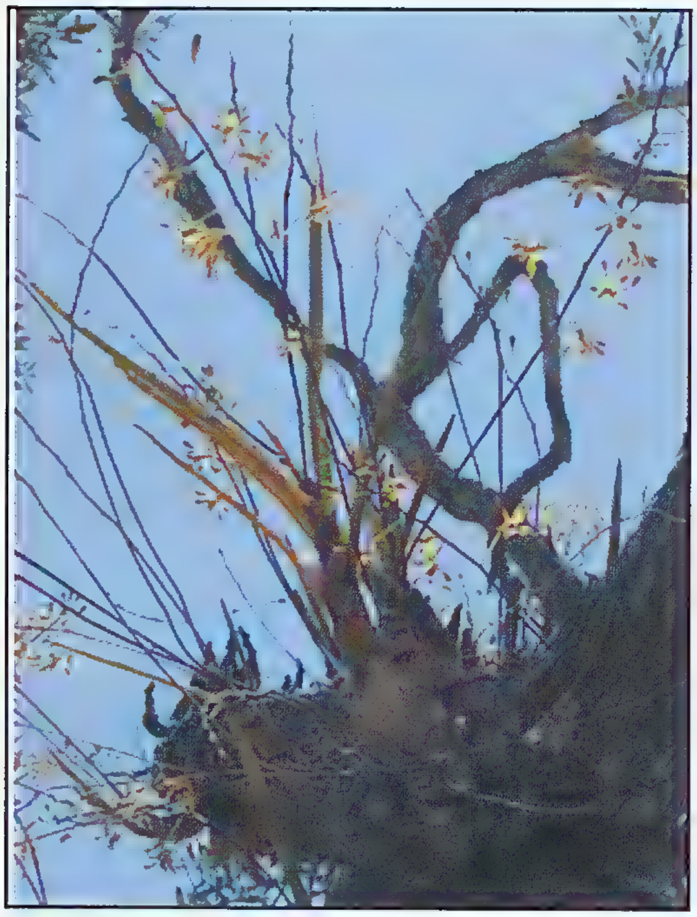

Figure 16. var. nigrescens with longer inflorescence.

regions.

The variety that creates much interest is the violet form that is unique to Badu Island and Horn Island within the Torres Strait (figures 6 & 7). This form is subject to higher moisture levels and displays average length racemes with good plant vigour and flower count, but with a distinctive violet colouration to the tips. When comparing this form to the previously discussed Weipa form, There is no evidence for the theory of the nodding habit of the Weipa form, as the violet form from Badu Is. and Horn Is. certainly holds its inflorescence upright and the flowers are fully opened when they set. This unique form does certainly open up some promise for interesting hybrids in the future.

**Natural Hybrids**

*D. canaliculatum* readily hybridises with other native dendrobiums within the natural habitat range. There is evidence of natural hybrids between *D. canaliculatum* and the following species: *D. semifuscum, D. trilamellatum, D. johannis, D. discolor,* and *D. carronii.* These natural hybrids all belong to the Spatulata group of dendrobiums and are often found growing and flowering together on the same hosts or within close proximity of each other. As these species do not usually exhibit purple on their labellum, the prominent characteristic that appears in most of

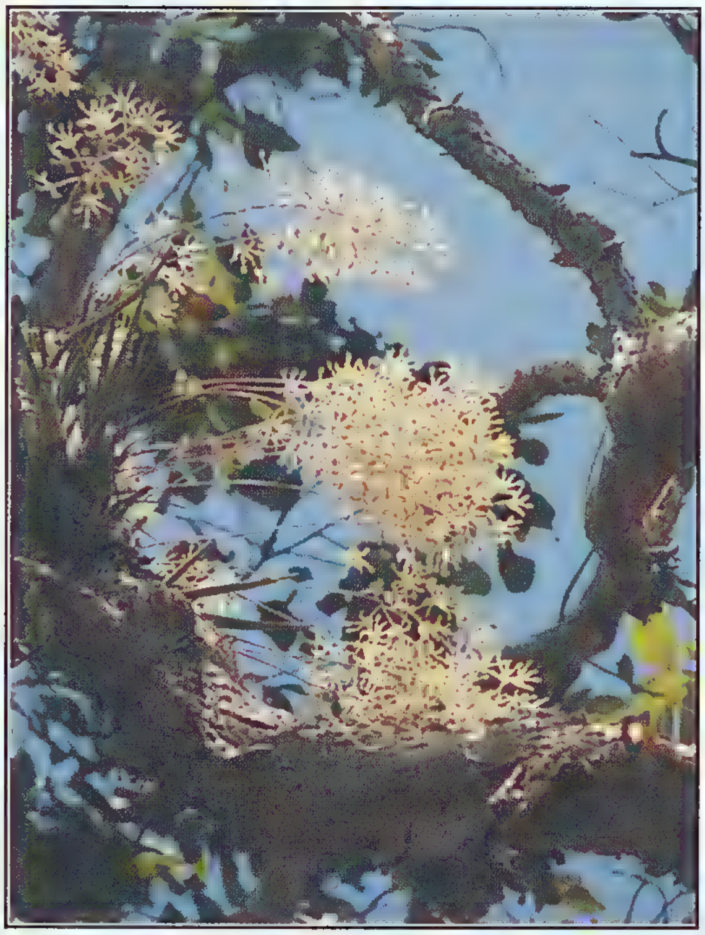

Figure 17. *D. canaliculatum* - Cardwell coastal form show longer inflorescence and more vigour.

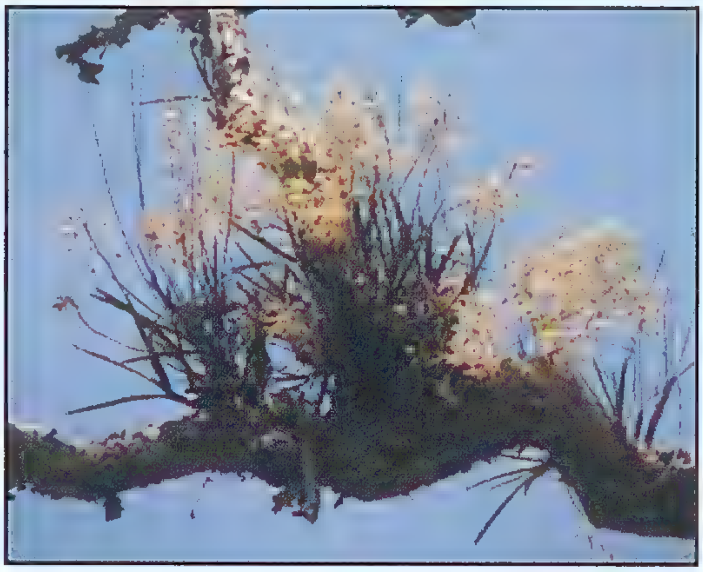

Figure 18. *D. canaliculatum* showing larger pseudobulbs and more vigour- Cardwell coastal form.

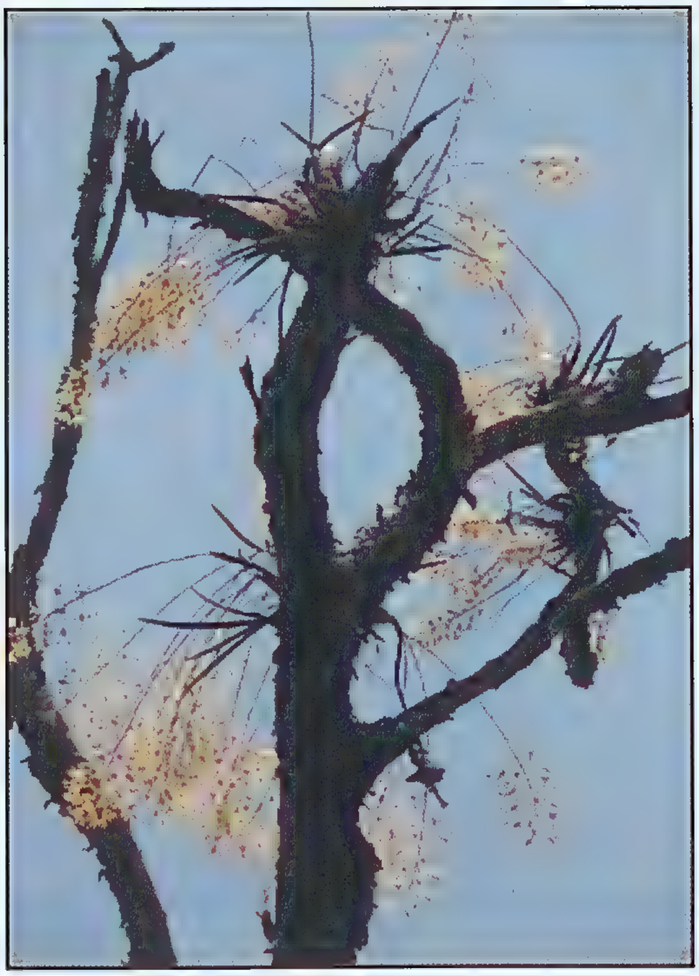

Figure 19. *D. canaliculatum* – Cardwell form growing in full sun on host tree.

Figure 20. Collection of *D. canaliculatum* and natural hybrids in Chris Cobb's collection (Edmonton-Nth Qld).

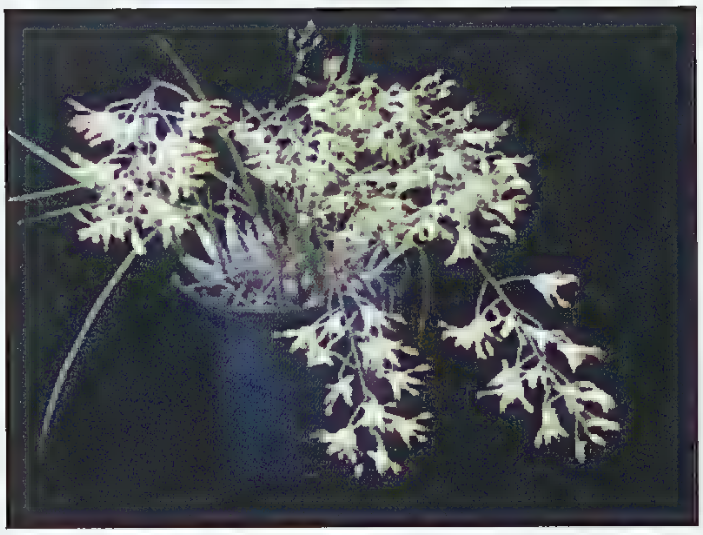

Figure 21. Weipa form showing similar colouration to east coastal form. Flowers are smaller and more cupped similar to *D. canaliculatum* var. *foelschei*

the natural primary hybrids found in the Lockhart River region, is the coloured labellum from the *D. canaliculatum* influence. Furthermore, most of the other native Spatulata species do not possess the terete leaf characteristics of *D. canaliculatum,* whereas the natural primary hybrids do exhibit *D. canaliculatum* influence in narrower and furrowed leaves.

## Influence of *D. canaliculatum* on its progeny?

Whether in natural or man-made hybrids, the influence of *D. canaliculatum* is often visible. in labellum colour and leaf characteristics. There are other telltale signs of *D. canaliculatum* in the parentage of hybrids. As many of the native *Spatulata* dendrobiums are taller growers, it is often noted that these taller pseudobulbs are not reduced in height, but are thickened by the influence of *D. canaliculatum.* It tends to increase floriferousness, with many progeny producing multiple inflorescences from each pseudobulb. Coleman (2009) concurs that many hybrids generally exhibite upright inflorescences with not necessarily increased flower count, but inflorescences that maintain a good flower count. He also reports a narrowing of the leaves with a definite furrowed characteristic. Many hybrids inherit a bunching of the leaves toward the top of the pseudobulbs, although both Cobb (2009) and Coleman (2009) believe this is not the case in all *D. canaliculatum* hybrids. During his many years of hybridising with *D. canaliculatum,* Coleman (2009) found that it reduced the physical height of many taller dendrobiums and that most of the progeny exhibited pseudobulbs that had a thicker, more swollen appearance. He states that *D. canaliculatum* also has the ability to hold the flowers more upright in hybrids. Experience also shows when crossed with New Guinea species, the progeny is more cool-tolerant.

In conclusion, *D. canaliculatum* exhibits a wide variety of colour forms, not only within the entire habitat range, but also within the confines of the narrower region of the Cape York Peninsula; and in particular the more localised Lockhart River area. Although, it is documented that there are various physical heights of pseudobulbs in the range, the culture and the physical environment impacts differently on specimens resulting in smaller and less vigorous plants in the dryer inland regions, with taller and more vigorous specimens in the higher moisture areas nearer the eastern coastline.

Within the four documented variations, the two that are prominent and exhibit a broader variation in colour appears to be *D. canaliculatum* var. *nigrescens* and *D. canaliculatum* var. *canaliculatum*. Even with the variations of colour and form, two prominent characteristics are imparted into both natural and man-made hybrids; that being the purple and white colouration of the labellum and influence on leaf shape. With the discovery of the violet-coloured form on Badu Island and Horn Island, there will certainly be expectations of more colour variety within the species; especially with inter-varietal hybrids. As a result, thtere will be the various colour forms of *D. canaliculatum* on the show bench.

However, the excitement will heighten with the increased progeny that will eventuate with selective hybridising using these newer colour varieties.

## Publcations and References

Interviews:

Cobb, C. Personal interview on 21 December 2009.

Coleman, B. Personal interview on 21 December 2009.

Publications:

Jones, D.L. (1988). Native Orchids of Australia. Australia: Reed Books Pty Ltd.

Jones, D.L. (2006). A Complete Guide to Native Orchids of Australia, including the Island Territories. Australia: New Holland Publishers Pty Ltd

Lavarack, B., Harris, W. & Stocker, G. (2006). Dendrobium and its Relatives. Australia: Kangaroo Press.

Lavarack, P.S., Gray, B. & Dockrill, A. (1985). Tropical Orchids of Australia. Australia: Thomas Nelson.

Watson Sharp, W. (1970). Australia's Native Orchids. Australia: K. G. Murray Publishing Co. Ltd.

Lavarack and Cribb (1983) A new species of *Dendrobium* from Cape York Peninsula and New Guinea. *Austrobaileya* **1**: 497-501.

Adams and Lawson (1993) Pollination in Australian orchids: A critical assessment of published reports 1882–1992. *Australian Journal of Botany* **41**: 553-75.

Clements and Jones (2002) Nomenclatural changes in the Dendrobieae (Orchidaceae) 1: The Australasian region. *Orchadian* **13**: 485-497.

Dockrill (1969) *Australian Indigenous Orchids*. The Society for Growing Australian Plants.

Dockrill (1992) *Australian Indigenous Orchids Vol.1.* 2nd Edition. Surrey Beatty and Sons.

II would like to express my sincere gratitude to both Chris Cobb for his invaluable field knowledge and the use of field photographs, and Brian Coleman for his vast hybridising knowledge and experience.

Photos - Chris Cobb

# R. D. Fitzgerald Trophy Awarded to Dr. Colin Bower

Colin entered Sydney University in 1966 and emerged in 1975 with a PhD in Zoology. During this time he developed a strong interest in bird watching, spending a lot of time in the bush with other like-minded students. He also remembers seeing his first native orchid, the large Flying Duck orchid, *Caleana major,* on a first year biology excursion. Also at university, Colin became involved with the environment group, Ecology Action, which played a major role in opposing the Eden woodchip scheme. He conducted independent research on the effects of forest clear-felling on birds and subsequently gave evidence to a Senate Inquiry.

In 2003, Dr. Bower left the public service to become an environmental consultant and he now works full-time undertaking flora surveys for environmental assessment of development projects. He is a member of the Ecological Consultants Association of NSW, an Honorary Associate of the Australian National Herbarium and a member of the Australian Entomological Society.

After moving to Bathurst, Dr. Bower joined the Central West Bushwalking Club and Bathurst Field Naturalist and Conservation Society. It was on an NPA camping trip to Newnes in the late 1970's that Dr. Bower's interest in native orchids began in earnest after a colleague pointed out on a walk that he was about to step on some orchid flowers. He went home and looked them up in Cady and Rotherham's wonderful little book, *Australian Native Orchids in Colour,* which he happened to have, but hadn't really studied until then. He was then hooked! His whole focus from that point on through the 1980's switched to finding orchids and photographing them. This led to a long association with many orchidologists, both professional and amateur. Like a few others, Dr. Bower developed a large collection of images, gathered all the literature and began to write a book. This enterprise ended with a house fire in 1990 which destroyed all the colour slides.

Not wanting to repeat all that work, Dr. Bower decided it was time to head in a new direction. Fortunately, in 1988 he went to a talk by Rod Peakall who had just finished his PhD on orchid pollination and population genetics. This began a long friendship and inspired Dr. Bower to start investigating, in his spare time, the pollination biology of Australian native terrestrial orchids and especially the sexually deceptive members of the subtribes Drakaeinae and Caladeniinae in eastern Australia. This work has now continued for nearly 20 years and has been extremely fruitful both personally and scientifically. It has allowed him to combine his entomological skills with his interest in orchids. It has resulted in the development of novel field bioassay techniques, the application of experimental scientific methods to the study of associations between Australian orchids and their pollinators, the discovery of new cryptic orchid species and new species of wasps. He has reported his discoveries in eight scientific papers published in refereed international scientific journals and seven articles published in *The Orchadian.* These publications have earned Dr. Bower an international scientific reputation as an innovative and productive pollination biologist and an expert of the pollination biology of Australian orchids. This reputation led the European and North American editors of the encyclopaedic series

*Genera Orchidacerearum* to invite Dr. Bower to provide the pollination accounts for all genera of the tribe Diurideae published in volume 2 of that series. Perhaps most importantly, his research on orchid pollination has been seminal in providing crucial background knowledge underpinning a series of ground-breaking studies by Professors Rod Peakall, Florian Schiestl and their colleagues, on the biochemistry of pheromones produced by sexually deceptive orchids and their pollinators.

Dr. Bower is highly regarded by those who know him. My initial contact with Dr. Bower was shortly following the formation of the *Prasophyllum affine* Recovery team in 2001, when an expert entomologist was required to conduct an in-depth study into the pollination dynamics of *P. affine* and Dr. Bower was the person suggested by the scientific authority on the team, Mr. David L. Jones. Expressions of interest were requested from various qualified persons but Dr. Bower was chosen due to his knowledge and interest in native orchids and their pollinators. The study required three continuous weeks in the field across three sites and resulted in a very detailed 65 page document (Feb 2002), which is the most comprehensive work on the pollinators of *P. affine.* Two subsequent papers were also completed into specific areas of pollinator requirements. These related to *Distribution and Movements* (May 2004) and *Nectar Resources* (April 2005). All three reports contributed greatly to the eventual decision to excise 53 hectares of *P. affine* and pollinator habitat from the planned Regional Shopping Centre at Vincentia, which ultimately ensure the protection of 300 individuals of *P. affine*, a population of *Cryptostylis hunteriana* and 25% of the known population of the rare *Calochilus pulchellus.*

His knowledge of pollination of native orchids is unsurpassed and Dr. Bower is highly regarded by his peers. A perusal of the papers he has written (reference list attached) is testament to his overall plant knowledge and his conservation ethic. Dr. Lachlan Copeland has high praise for the conscientiousness and thoroughness of the work of Dr. Bower and his collaboration with others well qualified in orchidaceous matters, such as Dr. Mark Clements and Jeff Jeanes, indicates he has the ability and willingness to work with a range of people for the long-term benefit of those concerned with orchid conservation and pollination.

Letters of support from a number of eminent Australian and international biologists follow:

"Colin's work on orchid pollination, undertaken primarily in his own time over more than two decades, is recognised nationally and internationally as meticulous, and ground breaking. He has been consistently rigorous in testing hypotheses about pollinator specifically in Australian orchids using bait flowers in the field. The insights gained and papers published are world class. The findings have helped significantly in unravelling the taxonomy and phylogeny of species complexes of orchids and of wasps involved especially in pollination through sexual deception. There are also major learnings relevant to conservation strategies." *Prof. Stephen Hopper*

First, let's remember that Fitzgerald carried out seminal research and field observations on self-pollination in the native orchids of Australia. He also commented on the low conversion rate of flowers into fruits in at least one *Dendrobium* species. Dr. Bower's work from 1992 until the present day is not only in concert with Fitzgerald's pioneer studies it expands and develops the role of insects as agents of cross-pollination in your terrestrial species. Bower has made considerable progress in less than 20 years of fieldwork. Fortunately, the Missouri Botanical Garden subscribes to *The Orchadian* and the *Australian Journal of Botany*. I own a copy of *Genera Orchidacearum* Volume 2 so it has been easy to follow Dr. Bower's progress whether he publishes his research alone or with Drs. Brown, Peakall. Mant and Weston. While I acknowledge the sheer importance of Dr. Bower's long-term work on the pollination of orchids by male wasps please note that I am most interested in his past studies on hybridization in *Diuris* and *Chiloglottis*. This topic does not get all the attention it deserves in Australian Orchidology despite the fact what we are going through a much-extended period in which large species are being chopped up into little ones. First generation (F1) hybrids and species with past histories of recombination must be identified and tracked if Australian treatments of orchid diversity are to remain relevant.

Second, let's also remember that Fitzgerald was not trained as a botanist. Dr. Bower's highest degree is in Zoology. One of the most exciting features of life in Australia is that people often enjoy double careers and it's their second career that makes the most positive impact on society. I've discussed this quality of careers with North American colleagues and we agree that what happens in Australia has no modern parallel in America or Canada. After all, we've forgotten what Fitzgerald did to better Australian railroads but his completed orchid publications live on. Likewise, the late Sophie Ducker is remembered for her contributions to studies on algae of the southern hemisphere and her books on the history of Botany. We don't have much to say about her job running student laboratories at the Melbourne University (although she did it for over a quarter of a century). The late, William W. Delaney is acknowledged for his work as a wildlife painter/illustrator compared to his professional employment as an architect. A dear friend of mine is about to receive an Australian Medal of Honor in June 2010 and I can assure you that it wasn't for her work at the ABC archives. I could go on and on but we really should consider ourselves lucky that Dr. Bower is making such accomplishments in our field while he is relatively young and fit instead of waiting for time allotted in retirement. Consequently, I argue there are few applicants as appropriate for this trophy as Colin Bower.
*Peter Bernhardt*

Col is an exceptional entomologist and botanist who has combined these skills with his love and fascination of Australian terrestrial orchids. His superb photography further enables him to freely share his enthusiasm for orchids with the public in popular articles and presentations.

Over many years, Col has devoted hundreds of hours of his spare time each season to the study of the pollination of Australia orchids, with a special emphasis on the sexually deceptive orchids that exhibit extraordinary diversity in Australia. During this work he has documented with extreme care the relationships between orchids and their specific pollinators. Consequently, he has undoubtedly uncovered the pollinator of more orchids than anyone else in the history of Australian orchidology. Along the way he has discovered many new species of pollinators as well as some new species of orchids.

Col's research has gone well beyond the mere discovery of the species involved in the partnership between orchid and pollinators. He has also experimentally evaluated the degree of pollinator specificity and explored the likely evolutionary processes involved in orchid speciation. The high calibre nature of this research is evident by his multiple scientific papers in the *Australian Journal of Botany*. He is also a co-author on additional papers published in high profile international scientific journals.

From a more personal perspective, I am indebted to Col for his ground breaking field-based studies that have underpinned my own multidisciplinary research program on the evolution and conservation of Australian terrestrial orchids. My international research program in this field would certainly not have been possible without the background knowledge discovered by Col. It is also remains a great privilege to have Col as an ongoing collaborator and co-author. I look forward to many more years of interaction in this capacity.
*Rod Peakall*

I strongly support the nomination of Dr Colin Bower for the R.D. Fitzgerald Trophy. Dr Bower's contribution to our understanding of the pollination systems of Australian Native orchids and their consequences for conservation clearly classify him for this prestigious prize. Dr. Bower has for many years and besides his job as an agricultural research investigated the pollination system of Australian orchids. This research was difficult and time intensive it required a lot of travel to remote areas. His research was clearly a pioneer endeavour since very little was known about pollinator identity and specificity in most Australian orchids before he started his work. Through many years of research and several publications with strong impact, he has established that orchids of many genera, especially the species with the peculiar pollination mechanism of "sexual deception" are highly specialised in their pollina for attraction. He has also established besides the finding of high specificity, the presence of so called "minor responders" basically a pool of related insects with the potential of being recruited as pollinators by the plant either through evolutionary diversification or adaptation to new pollinators in the face of environmental change.

Through his insights in the pollination biology and a keen observer's eye he has foreseen and suggested many taxonomic revisions that later proved correct through detailed molecular and chemical analyses. Besides of high interest to basic research Dr. Bower's findings also have strong implications for orchid conservation.

First of all they tell us that long term protection of the orchids can only work in connection with the protection of the pollinator insects since many orchids are dependent on sometime a single pollinator species for sexual reproduction.

Secondly we learn that despite this strong dependence there is also an adaptive flexibility through the so-called minor responders which the plant may adapt to in case their major pollinator disappears. Besides their direct impact, Dr. Bower's findings have also stimulated and enabled more research on the chemical ecology evolutionary dynamics and systematics of many groups of Australian native orchids. His type of research, being very time intensive is simply not do-able for most professional researchers with other academic commitments. Therefore it is extremely valuable though rare, to have such committed and skilled people like Dr. Bower engaged in the difficult endeavour of orchid pollination research. There is no doubt that his findings will continue to inspire new research and deepen our knowledge on the evolution and ecology of these fascinating plants and thus allowing us to implement effective protection measures.

*Dr. Florian Schies*

## Publications on orchids by C.C. Bower

Bower, C.C. (1992). The use of pollinators in the taxonomy of sexually deceptive orchids in the subtribe Caladeniinae (Orchidaceae). The Orchadian 10: 331-338.

Bower, C.C. & Branwhite, B. (1993). Observations on the pollination of Calochilus campestris R.Br. The Orchadian 11: 68-71.

Bower, C.C. (1996). Demonstration of pollinator-mediated reproductive isolation in sexually deceptive species of *Chiloglottis* (Orchidaceae: Caladeniinae). Australian Journal of Botany 44: 15-33.

Bower, C.C. & Brown, G.R. (1997). Hidden biodiversity: detection of crypticthynnine wasp species using sexually deceptive, female-mimicking orchids. Memoirs of the Museum of Victoria 56: 461-466.

Peakall, R., Bower, C.C., Logan, A.E. & Nicol, H.I. (1997). Confirmation of the hybrid origin of *Chiloglottis* x *pescottiana* (Orchidaceae: Diurideae). 1. Genetic and morphometric evidence. Australian Journal of Botany 45: 839-855.

Bower, C.C. (2001) Diurideae – pollination. Pp. in A.M. Pridgeon, P.J. Cribb & M.W. Chase (Eds) Genera Orchidacearum. Vol. 2. Orchidoideae (Part 1). Oxford University Press, Oxford.

Peakall, R., Jones, L., Bower, C.C. & Mackey, B.G. (2002). Bioclimatic assessment of the geographic and climatic limits to hybridisation in a sexually deceptive orchid system. Australian Journal of Botany 50: 21-30.

Mant, J., Bower, C.C., Weston, P.H. & Peakall, R. (2005). Phylogeography of pollinator-specific sexually deceptive *Chiloglottis* taxa (Orchidaceae): evidence for sympatric divergence? Molecular Ecology 14: 3067–3076.

Bower, C.C. (2006). Specific pollinators reveal a cryptic taxon in the bird orchid, *Chiloglottis valida* sensu lato (Orchidaceae) in south-eastern Australia. Australian Journal of Botany 54: 53-64.

Bower, C.C. (2006). Hybridisation between the Lemon Doubletail (*Diuris abbreviata*) and the Veined Doubletail (*D. venosa*) at Barrington Tops. The Orchadian 15: 256-262.

Bower, C.C. (2007). Serendipity and pollinators reveal a new cryptic spider orchid species related to *Caladenia concinna* (Rupp) D. Jones et M. Clements. The Orchadian 16(2): 60-69.

Bower, C.C. (2007). The Wasp, Ant and Bird Orchids of the *Chiloglottis* Alliance – A General Overview. The Orchadian 15: 402-417.

Bower, C.C. & Brown, G.R. (2009). Pollinator specificity, cryptic species and geographical patterns in pollinator responses to sexually deceptive orchids in the genus Chiloglottis: the Chiloglottis gunnii complex. Australian Journal of Botany 57: 37-55.

Phillips, R.D., Faast, R., Bower, C.C., Brown, G.R. & Peakall, R. (2009). Implications of pollination by food and sexual deception for pollinator specificity, fruit set, population genetics and conservation of Caladenia (Orchidaceae). Australian Journal of Botany 57: 287-306.

# *Serapias lingua* L. (tongue orchid)

## Naturalised in the Adelaide Hills, South Australia – *caveat cultivator*?

### Summary

The European tongue orchid (*Serapias lingua*) is reported as naturalised from a site at Ironbank in the Adelaide Hills, South Australia where plants have now been observed sporadically over at least a 13 year period. Despite the removal of all visible plants in 1997, there was subsequent re-establishment, with 23 plants again removed in 2010. Although the colony is small, the reappearance of plants after their presumed eradication, combined with evidence of limited seed set indicates that ongoing monitoring of the site is required to prevent further reoccurrence. This also suggests that the disposal of unwanted cultivated *Serapias* material should be done with care to prevent further escapes.

### Introduction

*Serapias lingua* L. is a relatively popular and easily grown terrestrial orchid from southern Europe, where it often forms large colonies (Lamond and Woods 1984; Wood 1986). Based on the number of plants displayed and sold at orchid shows in Adelaide over recent years, is the species also becoming increasingly common in Australian collections. *Serapias* L. is a widespread and morphologically variable, largely circum-Mediterranean genus of 27 species and 3 subspecies (Delforge 2005), characterised by the sepals and lateral petals adhering into a tubular galea and a distinctively 2-partite labellum with a 2-lobed hypochile and a pubescent, tongue-shaped, pendant epichile (Venhuis *et al.* 2006, 2007). Several species are considered to be vulnerable to endangered (e.g. Pereira *et al.* 2008), with *S. stenopetala* Maire & T. Stephenson from Algeria listed as critically endangered (de Bélair 2009). Nevertheless, Randall (2007) listed both *S. lingua* and *S. vomeracea* (Burm.) Briq. as species considered to be weeds outside Australia.

In early November 1997 an apparently naturalised population of *S. lingua* was reported by Enid Robertson from a native orchid-rich, Eucalypt-dominated Open Forest site on heavy clay soils at Ironbank in the Adelaide Hills, South Australia (Barker *et al.* 2005). At the time no fruiting plants were noted, all visible plants were removed and the species was thought to have been eradicated. Subsequently, a collection of *S. lingua* from suburban Adelaide housed at the Adelaide Herbarium (AD) was made by Bob Bates in 1998, who reported that it was a vegetatively spreading shade house pest under cultivation (CHAH 2009). Recent observations at Ironbank indicated that there have again been plants of *Serapias* flowering at the same site since at least 2006, albeit as a small, highly localised population along a long-disused graded vehicle access track through native bush.

Accordingly, because the plants appear to have re-established and persisted long term at this site, the structure of the population and its potential as a weed was assessed. Given the plant's apparent increasing availability to non-specialists as an easy-to-grow terrestrial orchid, it is important to determine if it poses a threat, should vegetative material be dumped and/or seeds be allowed to develop and disperse.

### The Site and Field Studies

The area along Morgan Road where *S. lingua* was growing is a weathered ridge consisting of a remnant *Eucalyptus obliqua* (Messmate stringybark) – *E. fasciculosa* (pink gum) – *E. cosmophylla* (cup gum) Open Forest community with a mixed sclerophyllous shrub understorey, similar to the vegetation of the nearby Mark Oliphant Conservation Park (NPWS SA 1996). There are few grasses or other ground covering plants and there is a reasonable litter cover. The site is located in the Mt Lofty Block (Province 3) – Peninsula Uplands (Environmental Region 3.2) – Clarendon Environmental Association 3.2.13 and the soil is a shallow, poorly drained, seasonally moist to wet, hard, mottled apedal yellow duplex with underlying clays (SA Govt 2000 onwards) with exposed underlying rock in several places. The town of Ironbank is ~1.5 km W (35.0434°S, 138.6871°E, 400 m AMSL) and has an annual rainfall of > 900 mm, predominantly in winter and spring, and mean temperature ranges of 9–22° (max) and 5–14° (min), with Jan–Feb the hottest and Jun–Jul the coldest.

In addition to *S. lingua*, the site also contains a wide variety of native orchids, many within a 20 m radius of the population, including *Acianthus caudatus* R. Br., *Calochilus* *robertsonii* Benth., *Caladenia carnea* R. Br. and *C. tentaculata* Schltdl., *Corybas* sp., *Diuris orientis* D. L. Jones, *D. pardina* Lindl., *Glossodia major* R. Br., *Leptoceras menziesii* (R. Br.) Lindl., *Microtis unifolia* (G. Forst.) Rchb. f. complex, *Pterostylis s. lat.* (at least 3 spp.) and *Thelymitra* (at least 6 spp.). The introduced South African weedy orchid *Disa bracteata* Sw. is also locally common (despite an active campaign) and disturbed areas along nearby access driveways also have abundant introduced grasses and weedy cormous Iridaceae, particularly *Moraea flaccida* (Sweet) Steud. (Cape tulip), *Sparaxis bulbilifera* (L.) Ker Gawl. (Harlequin flower) and *Watsonia meriana* (L.) Mill. var. *bulbillifera* (J. W. Mathews & L. Bolus) D. A. Cooke (Bulbil Watsonia).

Anecdotal evidence from local land owners suggests that the current *Serapias* plants at Ironbank may have arisen by deliberate re-introduction following the initial eradication by Enid Robertson in 1997, but this is uncertain and there is always the chance that some tubers may have survived the initial eradication. Flowering material of this second wave was first observed by EM and KM in 2005, at which time there were approximately three flowering plants observed. Further visits to the site occurred in 2007 and 2008 and while detailed counting of plants was not undertaken during any of these initial visits, the approximate size of the population was not observed to have substantially changed over this period. On each of these visits it was noted that something had chewed through the flower spikes of at least one of the flowering plants. Weeding of *Disa bracteata* has been undertaken sporadically by adjacent property owners in the general area for many years, but the immediate area of the site has not been weeded for more than 5 years. Re-grading of the track immediately adjacent to the site has, however, been undertaken and the infestation is mainly contained in the spoil mound from previous grading operations, where it grows intermingled with several species of native orchids and lilies, as well as introduced Iridaceae.

A visit to the site in Oct 2010 allowed for a survey of the population and its structure. The number of plants and their reproductive state (number of flowers, fruits and tubers) were all recorded as means and standard deviations. As per 1997, the entire area of infestation was carefully dug over with a trowel to a depth of 15 cm following rain when the clay soil was soft enough to dig. All visible plants and any tubers encountered during the removal digging were collected. Plants were identified using the keys to *Serapias* species in Lamond and Woods (1984) and Venhuis *et al.* (2006), but because there is no readily accessible detailed description for *S. lingua* the taxon is described here to allow for distinguishing it from the other species cultivated in Australia.

**Taxonomy**

***Serapias lingua*** L., Sp. Pl., ed. 1: 950 (1753)

Herbaceous, tuberous geophyte 10–30 cm high (Fig. 1A), tubers often appearing paired (old and new season's), ovoid-turbinate, 8–16 mm diam., shallow-buried (< 5 cm), roots fleshy, 2–3 mm diam., often developing terminal secondary tubers (Fig. 1B). Stem erect, smooth, green, reddish apically. Leaves 4–8, ~2-ranked, basal leaves 3–10 × 0.5–1 cm, narrowly lanceolate, acute, scape leaves 1–3, bract-like. Inflorescence 2–6-flowered; floral bracts 1.5–3 cm long, ovate-elliptic, acute to acuminate, purplish to greyish-violet. Flowers ~horizontal (Fig. 1C). Sepals and petals adhering into a tubular galea. Sepals 1.2–2.5 cm long, ovate-elliptic, acute, greyish-violet, nerves reddish-purple. Petals inside galea, 0.8–2.3 cm long, ovate-elliptic, apex subulate-acuminate, cream, nerves purple. Labellum 2–3 × 0.7–1 cm, pink to magenta, nerves darker; hypochile 0.7–1.3 × 1.3–1.8 cm, largely inside the galea, base cream with a flattish, hump-shaped, dark purple shiny callus 3–4 mm diam., side lobes erect, rounded, dark purple; epichile1–2 × 0.5–1 cm, broadly lanceolate, acuminate, narrowed basally, pubescent, pendent (Fig. 1D). Ovary obovoid-cylindrical, 10–15 × 3–4.5 mm; column 5–7 × 2.5–3.5 mm, greenish-yellow; connective acuminate-rostrate 4–6 mm long, greenish-yellow, flushed red. Capsule (immature) narrowly obovoid, at least 20 × 7 mm, apex bluntly flattened (Fig. 1E).

**Specimens Examined:** SOUTH AUSTRALIA: *E. L. Robertson 202*, Morgan Road, Ironbank, outside property “Mirrabinna”, Kate and Quentin Blows, 35.05° S, 138.70639° E, 6 Nov 1997 (AD99746271); *R. J. Bates 51298*, orchid house at Hope Valley, 34.84333° S, 138.69889° E, 18 Oct 1998 (AD107317); *J. G. Conran 2857*, Morgan Road, Ironbank, outside property "Mirrabinna", Kate and Quentin Blows, 35.045279° S, 138.704486° E, 17 Oct 2010 (AD, ADU).

Insert Fig. 1

## Results and Discussion

In Oct 2010 there were 23 plants in an area of ~1.5 m$^2$, all bearing 2–3 next season's tubers (average 2.1 ± 0.3), i.e. the replacement parent tuber and 1–2 lateral subsidiaries borne 1–6 cm from the parent. Six of these plants were flowering, each bearing 1–3 flowers per scape (average 2.3 ± 0.8). Fruit development was only seen from a single flower (7%), but at the time of collection the majority of the plants were still at anthesis.

*Serapias* are tuberous geophytes which make 1–6 subsidiary tubers per season, leading to rapid population growth locally (Periera *et al.* 2008). *Serapias lingua* extends from Portugal east to Crete and Rhodes, south to Morocco, Algeria and Tunisia and north to southern Brittany. In the Mediterranean it grows on dry to seasonally damp soils in heathlands (*garigue*), meadows, olive groves and open pine and oak woodlands from sea level to1,200 m (Wood 1986). The plants are apparently able to produce tubers even after early season defoliation, but flowering is prevented for that season (Darkwa and Scott 2008a), whereas shallow-buried tubers are more likely to show higher production of daughter tubers (Darkwa and Scott 2008b).

At Ironbank and the Adelaide Hills the environmental conditions are very similar to those across much of the range of *Serapias* in Europe, and the locally heavy, seasonally hard, dry soils at the infestation site mean that all the tubers seen were within 5 cm of the surface and most were only 1–2 cm deep. The plants are sometimes attacked by woollybear caterpillars of the black and white tiger moth (*Spilosoma glatignyi* (Le Guillou, 1841)), but if this were to occur early in the season, the evidence from Europe suggests that the plants can recover and still propagate vegetatively and the shallow tubers seen at Ironbank were also observed on average to be making multiple daughters. There is also evidence that an insect (possibly the same caterpillars) is decapitating some of the inflorescences.

In Europe *Serapias* flowers are pollinated by bees of the genera *Ceratina* Latreille, 1802 (Apidae), *Anthidium* Fabricius, 1804, *Megachile* Latreille, 1802 and *Osmia* Panzer, 1806 (Megachildae) and *Eucera* Scopoli, 1770 (Anthophoridae), as well as the cuckoo wasp *Chrysura refulgens* (Spinola 1806) (Chrysididae) and beetles from the families Oedemeridae and Lymexylidae (Baumann and Kunkele 1989; Gölz and Reinhard 1980; Filippi 2001; Pellegrino *et al.* 2005). *Serapias* displays a unique pollination strategy within Orchidaceae, using the galea as an overnight shelter for solitary bees (van der Cingel 1995, 2001; Vereecken *et al.* 2010), with unpollinated flowers reported to be >3° C warmer than either pollinated flowers or ambient night time and early morning temperatures, thus apparently rewarding pollinators thermally (Vöth 1980; Dafni *et al.* 1981; Jersáková *et al.* 2006), with receptive flowers oriented to be heated by the sun during the day being those preferred by the insects (Felicioli *et al.* 1998; Filippi 2001).

In contrast, Schiestl and Cozzolino (2008) and Veerstecken *et al.* (2010) noted that *S. lingua* was pollinated by male bees, especially male *Ceratina cucurbitina* (Rossi, 1792) through scent-mediated sexual deception and Pellegrino *et al.* (2005) argued that the florally similar *S. vomeracea* was also pollinated by deception. This suggests that *Serapias* uses time share by sex, with diurnal deceit pollination by male bees and nocturnal/early morning shelter-based pollination by male and less frequently females, as well as other heat-seeking visitors. In addition, autogamy and cleistogamy have been reported in *Serapias perez-chiscanoi* (Periera *et al.* 2008). *S. lingua* (Pais 1969), *S. parviflora* Parl. (Veerstecken *et al.* 2010) and *S. vomeracea* (Pellegrino *et al.* 2006).

All of the families of insect that pollinate *Serapias* in Europe also occur in Australia and the presence of at least one fruit means that either pollination or autogamy is occurring in the population. There are *Megachile* species across Australia, but the native species of *Ceratina* are confined to the eastern States (ABRS 2009). The apparent low fruit set in the Ironbank population agrees with the levels of fruit set for *Serapias* and similar non-rewarding orchids, especially those which also display relatively low levels of autogamy (Pellegrino *et al*. 2006; Periera *et al*. 2008).

The fact that there is some *Serapias* fruit set at the site implies the chance for wider colonisation as well as re-establishment after removal of the adults. However, orchids require the presence of the correct mycorrhizal fungi in order to germinate and establish (Dearnaley 2007). *Serapias* species use *Epulorhiza* or *Tulasnella*-like '*Rhizoctonia*' fungi as their mycorrhizal symbionts (Clements *et al.* 1986; Látalová and Baláž 2010), but apparently show a fairly wide range of fungal cross-compatibility (Muir 1989). *Disa bracteata* in Australia (and which grows at the same site) is also diverse in its mycorrhizal compatibility, utilising several *Tulasnella* species shared with a range of native orchid genera and other weedy orchids (including the native *Microtis unifolia*) appear to display similarly catholic fungal associations (Bonnardeaux *et al.* 2007). However, the degree of fungal specificity and/or cross compatibility between *Serapias* and Australian orchid mycorrhizae requires investigation before the likelihood of seedling establishment in Australian conditions can be determined accurately and this is the subject of ongoing research. Nevertheless, all of the re-established plants seen at Ironbank in 2010 were flowering or near flowering size and this, combined with the relatively small total number of plants suggests that at this stage they are mainly propagating by vegetative means rather than through sexual reproduction.

## Conclusions

The implications for the persistence and control of the population are that ongoing monitoring is needed, given that the population has already recovered once from a thorough eradication attempt. This should allow for all the plants to be permanently removed after several seasons if reproduction has only been vegetative. Of more concern is that since there is some level of seed set, there may be seedling establishment and possible spread of the population. In that case longer and possible wider monitoring is needed to make sure that there has been no seedling establishment, given the abundance of other orchids in the area and the known ability of *Serapias* to use a wide range of fungal hosts.

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References

ABRS (2009) Australian Faunal Directory (Australian Biological Resources Study: Canberra). Available at http://www.environment.gov.au/biodiversity/abrs/online-resources/fauna/afd/index.html [Accessed 11 Nov 2010].

Barker, WR, Barker, RM, Jessop, J and Vonow, HP (Eds) (2005) *Census of South Australian Vascular Plants. 5th Edition. Journal of the Adelaide Botanic Gardens, Supplement 1.* Botanic Gardens of Adelaide & State Herbarium, Adelaide.

Baumann, H and Kunkele, S (1989) Die Gattung *Serapias* L. – eine taxonomische Übersicht. Mitteilungsblatt Beiträge zur Erhaltung Erforschung heimischer. *Die Orchideen* **21**, 701–946.

Bonnardeaux, Y, Brundrett, M, Batty, A, Dixon, K, Koch, J and Sivasithamparam, K (2007) Diversity of mycorrhizal fungi of terrestrial orchids: compatibility webs, brief encounters, lasting relationships and alien invasions. *Mycological Research* **111**, 51–61.

CHAH (2009) AVH: Australia's Virtual Herbarium (Council of Heads of Australasian Herbaria Inc. (CHAH): Canberra). Available at http://www.ersa.edu.au/avh/ [Accessed 28 Oct 2010].

Clements, MA, Muir, H and Cribb, PJ (1986) A preliminary report on the symbiotic germination of European terrestrial orchids. *Kew Bulletin* **41**, 437–445.

Dafni, A, Ivri, Y and Brantjes, N (1981) Pollination of *Serapias vomeracea* Briq (Orchidaceae) by imitation of holes for sleeping solitary male bees (Hymenoptera). *Acta Botanica Neerlandica* **30**, 69–73.

Darkwa, A and Scott, P (2008a) Growth and influence of defoliation in terrestrial orchids, *Anacamptis morio* and *Serapia lingua. Comparative Biochemistry and Physiology – Part A: Molecular and Integrative Physiology* **150**, S197.

Darkwa, A and Scott, P (2008b) Influence of depth of planting on stolon and tuber formation in *Serapia lingua. Comparative Biochemistry and Physiology – Part A: Molecular and Integrative Physiology* **150**, S197.

Dearnaley, J (2007) Further advances in orchid mycorrhizal research. *Mycorrhiza* **17**, 475–486.

Delforge, P (2005) *Orchids of Europe, North Africa and the Middle East*. Timber Press, Portland, Oregon.

Felicioli, A, Strumia, F, Filippi, L, Pinzauti, M (1998) Observations on the relation between orchids of the genus *Serapias* and their pollinators in an area of central Tuscany. *Frustula Entomologica* **21**, 103–108.

Filippi, L (2001) Alcuni giorni in compagnia di *Serapias vomeracea laxiflora* (Orchideaceae) e di *Chrysura refulgens* (Hymenoptera: Chrysididae). *HY-MEN* **10**, 11–13.

Gölz, P and Reinhard, HR (1980) *Serapias* (Orchidaceae) – Ergebnisse statistischer und chorologischer Untersuchungen. *Mitteilungsblatt Arbeitskreisen Heimische Orchideen Baden-Württemberg* **12**, 123–189.

Jersáková, J, Johnson, SD and Kindlmann, P (2006) Mechanisms and evolution of deceptive pollination in orchids. *Biological Reviews* **81**, 219–235.

Lamond, J, Woods, PJB (1984) Orchidaceae: 13. *Serapias*. In 'The European garden flora, a manual for the identification of plants cultivated in Europe, both out-of-doors and under glass, Volume 2, Monocotyledons (Part II).' (Eds SM Walters, A Brady, CD Brickell, J Cullen, PS Green, J Lewis, VA Matthews, DA Webb, PF Yeo, JCM Alexander.) pp. 164–165. (Cambidge University Press: Cambridge)

Látalová, K and Baláž, M (2010) Carbon nutrition of mature green orchid *Serapias strictiflora* and its mycorrhizal fungus *Epulorhiza* sp. *Biologia Plantarum* **54**, 97–104.

Muir, HJ (1989) Germination and mycorrhizal fungus compatibility in European orchids. In *Modern methods in orchid conservation: the role of physiology, ecology and management*. Ed. HW Pritchard, pp. 39–56. Cambridge University Press, Cambridge.

Pais, MMS (1969) L'autogamie chez *Serapias lingua* (Orchideés). *Portugaliae Acta Biologica* **11**, 297–300.

Pellegrino, G, Gargano, D, Noce, ME and Musacchio, A (2005) Reproductive biology and pollinator limitation in a deceptive orchid, *Serapias vomeracea* (Orchidaceae). *Plant Species Biology* **20**, 33–39.

Pellegrino, G, Noce, M, Bellusci, F and Musacchio, A (2006) Reproductive biology and conservation genetics of *Serapias vomeracea* (Orchidaceae). *Folia Geobotanica* **41**, 21–32.

Pereira, M, Venhuis, C and Gutierres, F (2008) The ecology of *Serapias perez-chiscanoi* C. Acedo in Alentejo Portugal. *Lazaroa* **2008**, 1–9.

Randall, R (2007) The introduced flora of Australia and its weed status (CRC for Australian Weed Management: Glen Osmond, SA). http://www.weeds.crc.org.au/weed_management/intro_flora.html#book [Accessed 13 Dec. 2007].

SA Govt (2000 onwards) *Online Atlas of South Australia*. Available at http://www.atlas.sa.gov.au/ [Accessed 28 Oct 2010].

van der Cingel, NA (1995) *An Atlas of orchid pollination: European orchids*. A. A. Balkema, Rotterdam.

van der Cingel, NA (2001) *An Atlas of orchid pollination: America, Africa, Asia and Australia*. A. A. Balkema, Rotterdam.

Venhuis, C, Venhuis, P and Ellis-Adam, AC (2006) A new tongue-orchid (Orchidaceae) in southwest Spain: *Serapias occidentalis. Anales del Jardin Botánico de Madrid* **63**, 131–143.

Venhuis, C, Venhuis, P, Oostermeijer, JGB and van Tienderen, PH (2007) Morphological systematics of *Serapias* L. (Orchidaceae) in Southwest Europe. *Plant Systematics and Evolution* **265**, 165–177.

Vereecken, N, Dafni, A and Cozzolino, S (2010) Pollination syndromes in Mediterranean orchids – implications for speciation, taxonomy and conservation. *The Botanical Review* **76**, 220–240.

Vöth, W (1980) Können Serapiasblüten Nesttäuschblumen sein? *Die Orchideen* **31**, 159–162.

Wood, JG (1986) Some European orchids in cultivation. Plant portrait: 51. *Serapias lingua* & *S. vomeracea* subsp. *orientalis*. *Kew Magazine* **3**, 22–28.

**Figure 1.** *Serapias lingua* at Morgan Road, Ironbank, South Australia (voucher *J. G. Conran 2857*, AD, ADU). A. Population *in situ*; B. Habit showing 2-ranked leaves and lateral secondary tuber; C. Flowers; D. Close up of flower and labellum showing a single, hump-like gland on the hypochile; E. Immature fruit. Scale bars A=10 cm, B=20 mm, C–E=10 mm.

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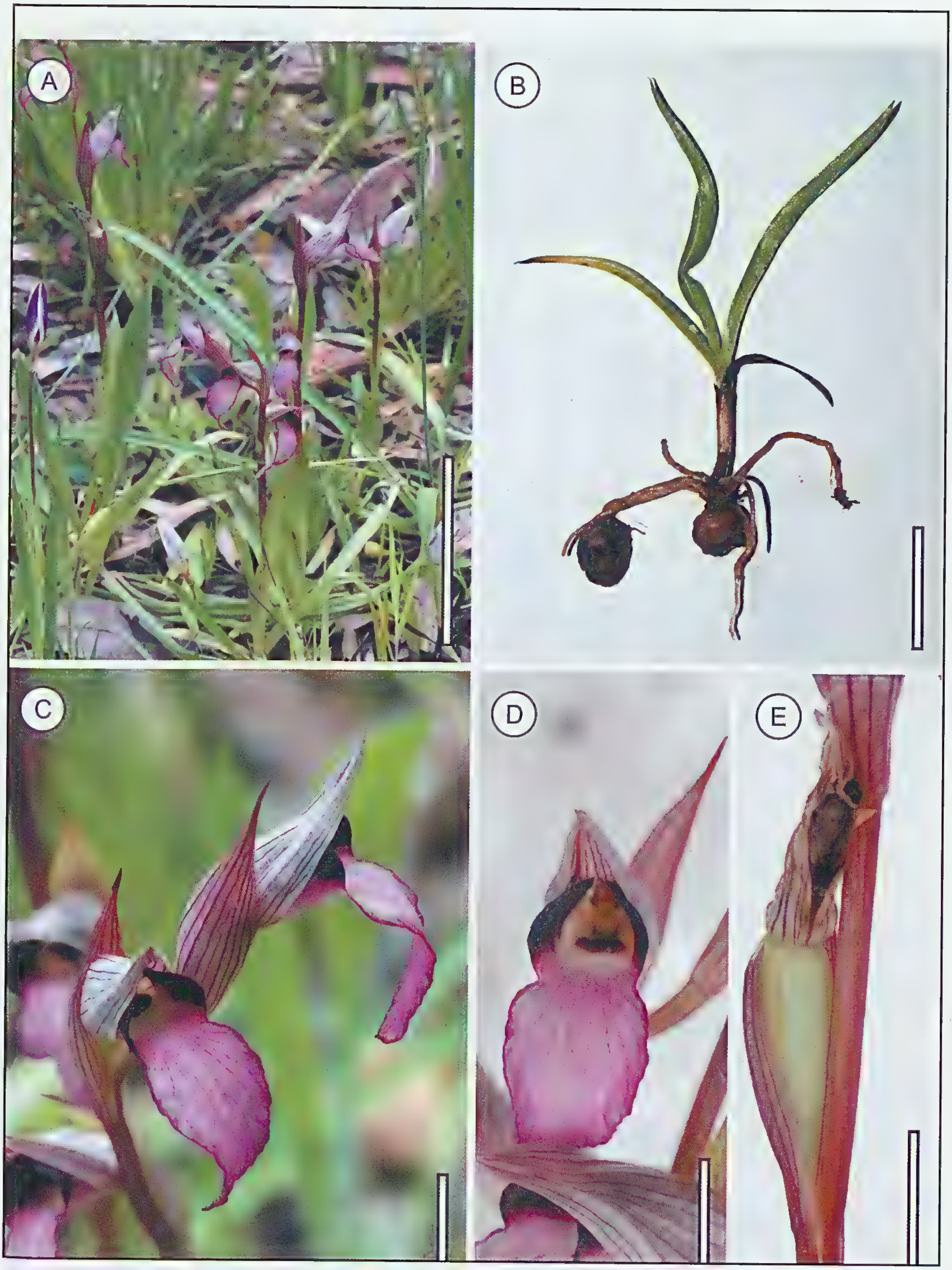
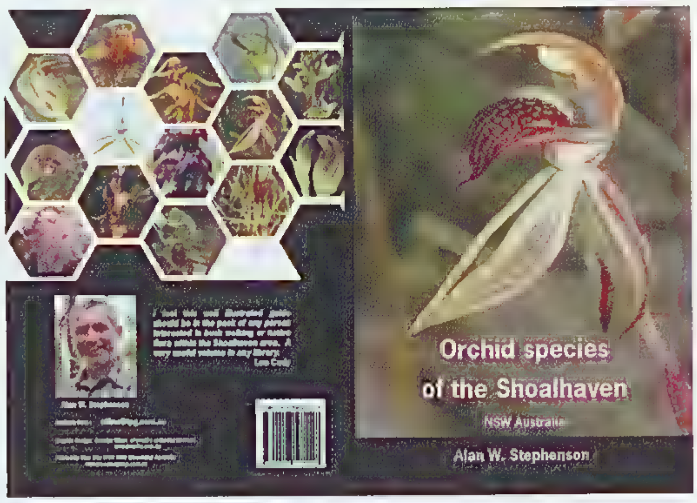


Figure 1 Serapas lingua

# Orchid Species of the Shoalhaven

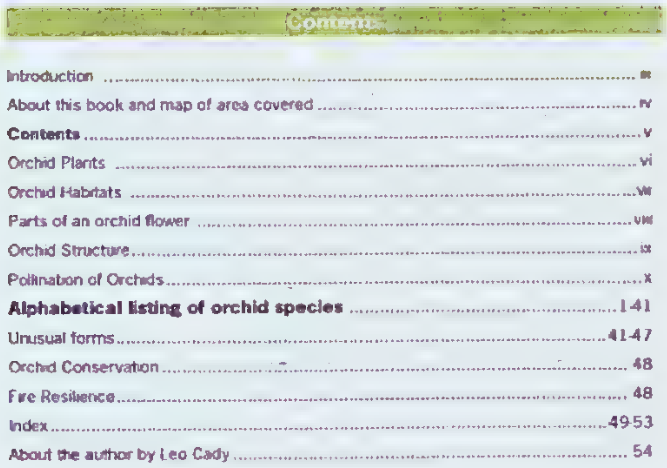


Alan Stephenson has published "*Orchid Species of the Shhoalhaven*".

The book contains colour photos of 138 orchid species within the Shoalhaven region including one natural, hybrid, plus four unnamed species.

The book contains a map of the area covered. The image of the table of contents gives an idea of what the book actually covers.

This book is the first attempt to document all indigenous orchid species in the Shoalhaven Region. New nomenclature is used but old nomenclature is also used with one common name for each species, where applicable. It will retail at $20 plus postage and handling. When released on June 4th it will initially be available only through Alan at affine@tpg.com.au. The front cover contains a photo of *Arachnorchis tessellata* with all 14 Shoalhaven threatened species on the rear cover.



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# New Species of Papuan *Agrostophyllum* 1

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**ABSTRACT:** Six new species of *Agrostophyllum* Blume from New Guinea are described and illustrated. The new taxa are *A. atrobrunneum, A. beleense, A. crassilabium, A. daymanense, A. habbemense* and *A. isuaravum.*

**Key Words:** New Guinea, *Agrostophyllum,* new species.

The genus *Agrostophyllum* comprises just over 100 species distributed from Nepal to Samoa. More than half (56) of the species are known to occur on the island of New Guinea with at least 48 of these believed to be endemic. Schlechter (1912) divided the genus into four sections based on habit and inflorescence characters. All the species described here belong to Section *Agrostophyllum,* a group that houses the majority (44) of Papuan taxa.

A brief comment is required on the name *A. leucocephalum* Schltr., published in 1905. This species is putatively related to three of the new taxa described here and it is one of the most commonly collected montane members of the genus in Papua New Guinea. Previously (Ormerod 2010) I used the later name *A. graminifolium* Schltr. for this plant but have since found after a comparison of isotypes that the two are conspecific. One further complication is that Schlechter (1912) misapplied the name *A. leucocephalum* to a still undescribed species (related to *A. milneanum,* described in Part 2).

### *Agrostophyllum atrobrunneum* Ormerod, sp. nov.

Type: Indonesia – Papua Prov., 15 km S of Bernhard Camp, Idenburg River, 1800 m, January 1939, *L.J. Brass 12072* (Holotype: AMES!; Isotype: BRI!).

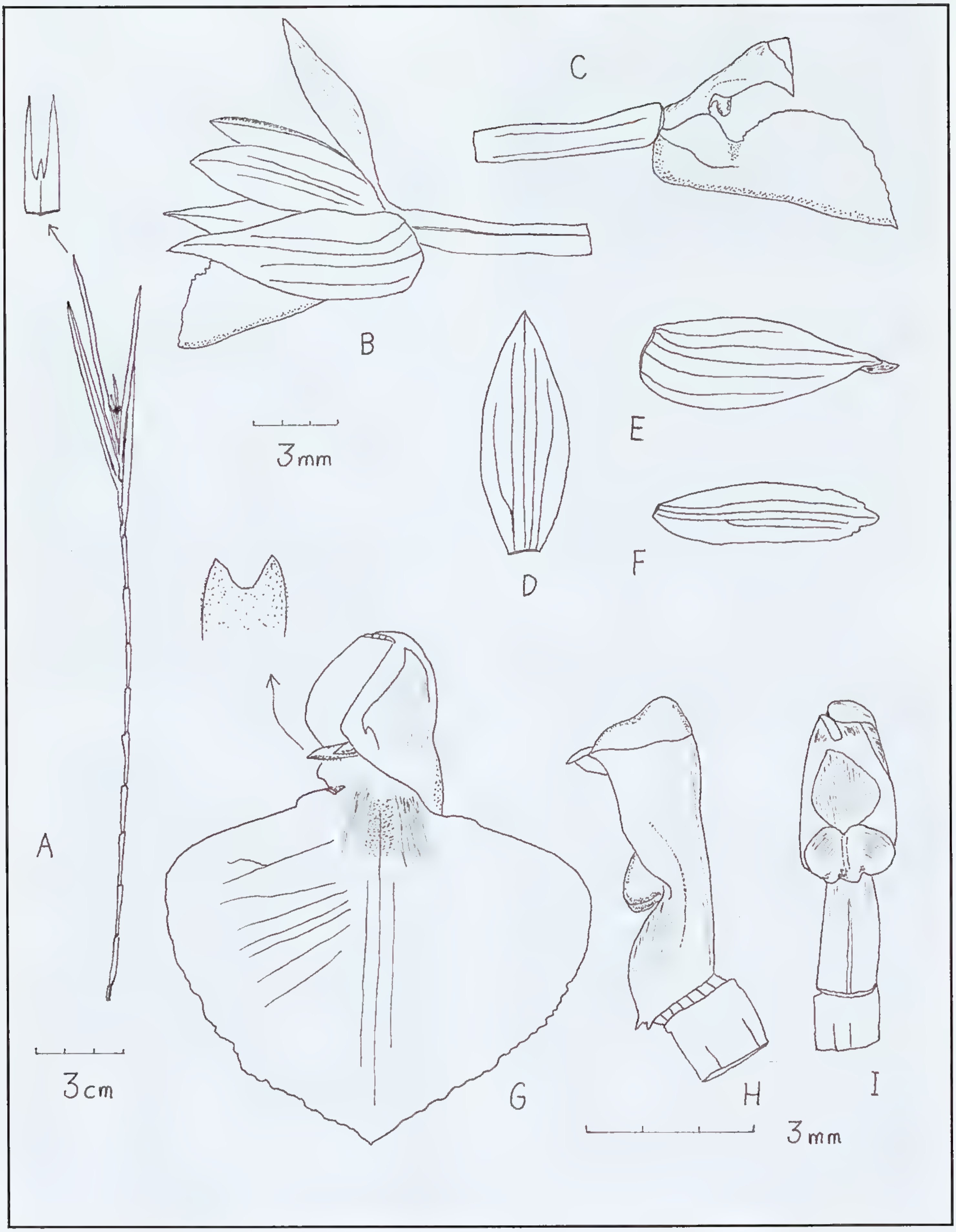
*Affinis A. uniflorum* Schltr. *sed caule 4-7(vs. subdensifoliatis) foliatis et vaginis foliis stipulatis (non estipulatis) differt.*

Epiphytic herb. Roots terete, pubescent, 0.5-1.0 mm thick. Rhizome terete, branching, appearing ascendant, to 13 cm long. Stems subterete, up to 2.5 cm apart, laxly 4-7 leaved in upper half or near apex, rarely throughout, 16.2-28.0 cm long, 0.10-0.15 cm thick. Leaves erect, linear, apex equally to inequally long bicuspidate, medially mucronate, thin, 35-70 mm long, 1.5-2.5 mm wide, cusps 1-3 mm long, mucro to 0.75 mm long; leaf sheaths dark brown (fungus?, yellow-green on isotype), 13-18 mm long, at apices each side with a slender, thin stipule 1-2 mm long. Inflorescence terminal, composed of a few sheaths and bracts, 1-2 flowered, to 20 mm long, ca. 3 mm wide. Pedicellate ovary subterete, ca. 6 mm long. Flowers white, lip with a yellow spot at base of epichile.

Dorsal sepal oblong-lanceolate, acute, 4 veined, one lateral vein branched, 7.8 mm long, 3 mm wide. Lateral sepals obliquely elliptic-lanceolate, acute, midvein dorsally carinate apically, 8.3 mm long, 3.2 mm wide. Petals oblong-ligulate, subacute, 3 veined, 7.2-7.3 mm long, 1.95 mm wide. Labellum trilobed, 8 mm long; hypochile with broadly rounded sidelobes, ca. 2.0-2.1 mm long, ca. 1 mm wide dorsally, 2 mm wide laterally; ligula subquadrate, apex bidentate, papillose-pubescent; epichile broadly ovate-reniform, subacute, 5.8-

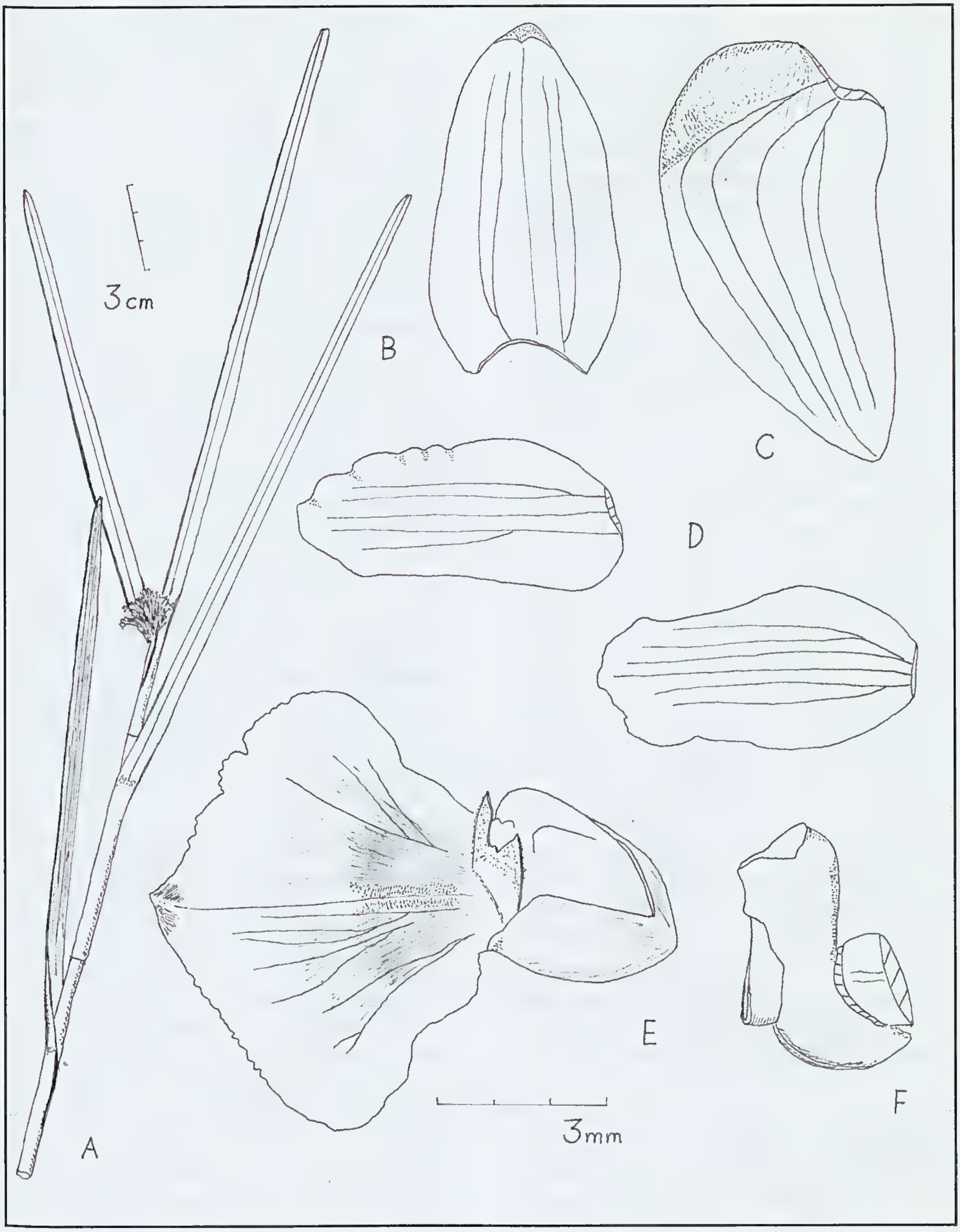
6.0 mm long, 6.9 mm wide. Column 3.75 mm long.

**Distribution:** Indonesia (Papua Prov.). **Habitat:** Common low clump epiphyte in mossy forest, 1800 m.



Agrostophyllum atrobrunneum - A. stem (leaf tip arrowed): B. flower; C. flower minus tepals; D. dosal sepal; E.lateral sepal; F. petal; G.labellum (ligula arrowed); H, I column, lateral sepaland ventral views. A,B-F and G,H,I to respective scales. Drawn from holotype.

**Etymology:** From the Latin *ater*, dark and *brunneus*, brown in reference to the dark brown colour (probably due to a fungus) of the leaf sheaths on the holotype (yellow-green on the isotype). This species is most similar to *A.*



Agrostophyllum beleense - A. stem, upper half; B. dosal sepal; C. lateral sepal; D. petals; E.labellum F. column. A and B-F to respective scales. Drawn from holotype.

*uniflorum* Schltr. but differs from it in having stems with much fewer (4-7, rarely more) leaves, leaf sheaths that have a short slender stipule (vs. estipulate) and flowers with an entire (not trilobulate) epichile.

Members of the *A. uniflorum* complex have very similar floral features but they can be separated using vegetative characters such as leaf tip shape, leaf sheath shape and shape/size of the leaf sheath stipules.

### *Agrostophyllum beleense* Ormerod, *sp. nov.*

Type: Indonesia – Papua Prov., Bele river, 18 km NE of Lake Habbema, 2400 m, November 1938, *L.J. Brass 11461* (Holotype: AMES!; Isotype: BRI!).
*Affinis A. leucocephalum* Schltr. *sed epichilo labello integris (non trilobulatis) et late rhombicis (non late trapeziformis) differt.*

Epiphytic herb. Roots terete, to 1 mm thick. Stems caespitose, complanate, covered by leaf sheaths in lower half, upper half with partly exposed internodes, laxly 5-7 leaved, ca. 32-34 cm long, 0.35 cm wide. Leaves erect, linear-ligulate, apex inequally acutely to subacutely bidentate, shortly broad apiculate, 17.7-20.5 cm long, 0.6 cm wide; leaf sheaths black-margined, 5-9 cm long, stipules deltate to lanceolate, acute to subacute, 1.0-1.5 mm long. Inflorescence terminal, composed of several sheaths and bracts, 6 or more flowered, to 2 cm long, 1.5-2.0 cm wide.

Pedicellate ovary subterete, 6.0-6.5 mm long. Flowers white, lip (at epichile base?) with yellow. Dorsal sepal ovate, apex obtuse, shortly cucullate, 3 veined, lateral veins branched, 5.1 mm long, 3.2 mm wide. Lateral sepals obliquely ovate, acute to obtuse, 3 veined, lateral veins branched, midvein low carinate externally, 7-8 mm long, 3.9-4.3 mm wide. Petals irregularly oblong to oblong-elliptic, obtuse, 3 veined, lateral veins branched, 5.0-5.1 mm long, 2.3-2.7 mm wide. Labellum trilobed, 8.9 mm long; hypochile with obtuse-truncate sidelobes, 3 mm long, 2 mm wide dorsally, 1.5 mm wide laterally; ligula subquadrate, acutely bidentate, minutely papillose-pubescent, ca. 1.9 mm tall; epichile widely rhombic, subacute, entire, fleshy apically, ca. 5.9 mm long, 7 mm wide. Column erect, 2.2 mm tall.

**Distribution:** Indonesia (Papua Prov.).

**Habitat:** Large clumps on mossy butts of trees, 2400 m.

**Etymology:** Named for the type locality, the Bele River.
This species is closely related to *A. leucocephalum* Schltr., resembling it in habit and most floral characters. However *A. beleense* may be distinguished from the latter by its entire (not trilobulate) labellum epichile which spreads from the hypochile at about 45 (not 60-90) degrees.

### *Agrostophyllum crassilabium* Ormerod, *sp. nov.*

Type: Indonesia – Papua Prov., 18 km SW of Bernhard Camp, Idenburg River, 2150 m, February 1939, *L.J. Brass 12691* (Holotype: AMES!).
*Affinis A. leucocephalum* Schltr. *sed epichilo labello integris (non trilobulatis) et crassissimus differt.*

Epiphytic herb. Roots terete, pubescent, to 1.5 mm thick. Stems caespitose, terete basally, slightly compressed above, clothed with leaf sheaths, apex 3(-5?) leaved, 33.7 cm long, 0.20-0.35 cm thick. Leaves erect, linear-ligulate, apex acute to minutely acutely obliquely inequally bidentate, 21.2-23.3 cm long, 0.55-0.68 cm wide; leaf sheaths black margined, 3.5-4.0 cm long, 0.50-0.55 cm wide, stipules deltate, obtuse, to 0.3 cm long. Inflorescence terminal, composed of several bracts and sheaths, 5 or more flowered, 2 cm long and wide. Pedicellate ovary triquetrous but with rounded ribs, possibly laxly furfuraceous, ca. 12 mm long. Flowers externally laxly furfuraceous, very pale yellow, lip white. Dorsal sepal ovate-elliptic, acute, midvein lightly carinate in upper half, 4-5 veined, 5.3 mm long, 3.3 mm wide. Lateral sepals obliquely ovate-elliptic, acute, midvein narrowly carinate, 4-5 veined, 7 mm long, 3.4 mm wide. Petals irregularly oblong-lanceolate, subacute, 3 veined, 5 mm long, 1.8 mm wide. Labellum trilobed, 7 mm long; hypochile with low, almost straight edged truncate sidelobes, ca. 2 mm long, 1.8 mm wide laterally; ligula subquadrate, apex recurved, trilobulate, papillose-pubescent; epichile suborbicular, margin irregular, obtuse, very fleshy, ca. 5 mm long, 5.5 mm wide. Column 3 mm long.

**Distribution:** Indonesia (Papua Prov.).

**Habitat:** Clumped on branches of taller trees in mossy forest, 2150 m.

**Etymology:** From the Latin *crassus*, thick and *labium*, lip in reference to the fleshy labellum.
This species seems to be related to *A. leucocephalum* Schltr. but the leaves are close together apically (not spaced apically and exposing the internodes) and the labellum has an entire, fleshy (vs. trilobulate, thinner) epichile.

***Agrostophyllum daymanense*** Ormerod, *sp. nov.*

Type: Papua New Guinea – Milne Bay Prov., Maneau Range, N slopes of Mt. Dayman, 2150 m, *L.J. Brass 22960* (Holotype: AMES!).

*Affinis A. pelorioides* Schltr. *sed caulibus longioribus (52.5 vs. 30 cm), foliis brevioribus (ad 20 vs. 28 cm) et ovario brevioribus (6.5 vs. 8 mm) differt.*

Epiphytic herb. Roots terete, pubescent. Stems caespitose, compressed, laxly 11-leaved, with leaves more widely spaced in upper 19.5 cm and thus exposing internodes for 2.5-6.5 cm, lower 35 cm completely covered by complanate leaf sheaths, 52.5 cm long, ca. 0.5 cm thick. Leaves linear-ligulate, apex shortly bidentate with a broad apiculus, 10-20 cm long, 1.00-1.15 cm wide; leaf sheaths compressed, black margined, exposed part 5-7 cm long, 0.5-0.8 cm wide laterally, stipules deltate, to 1 mm long. Inflorescence terminal, composed of numerous bracts and sheaths, many flowered, ca. 2.5 cm long, 2 cm wide. Pedicellate ovary clavate, 6.5 mm long. Flowers white.

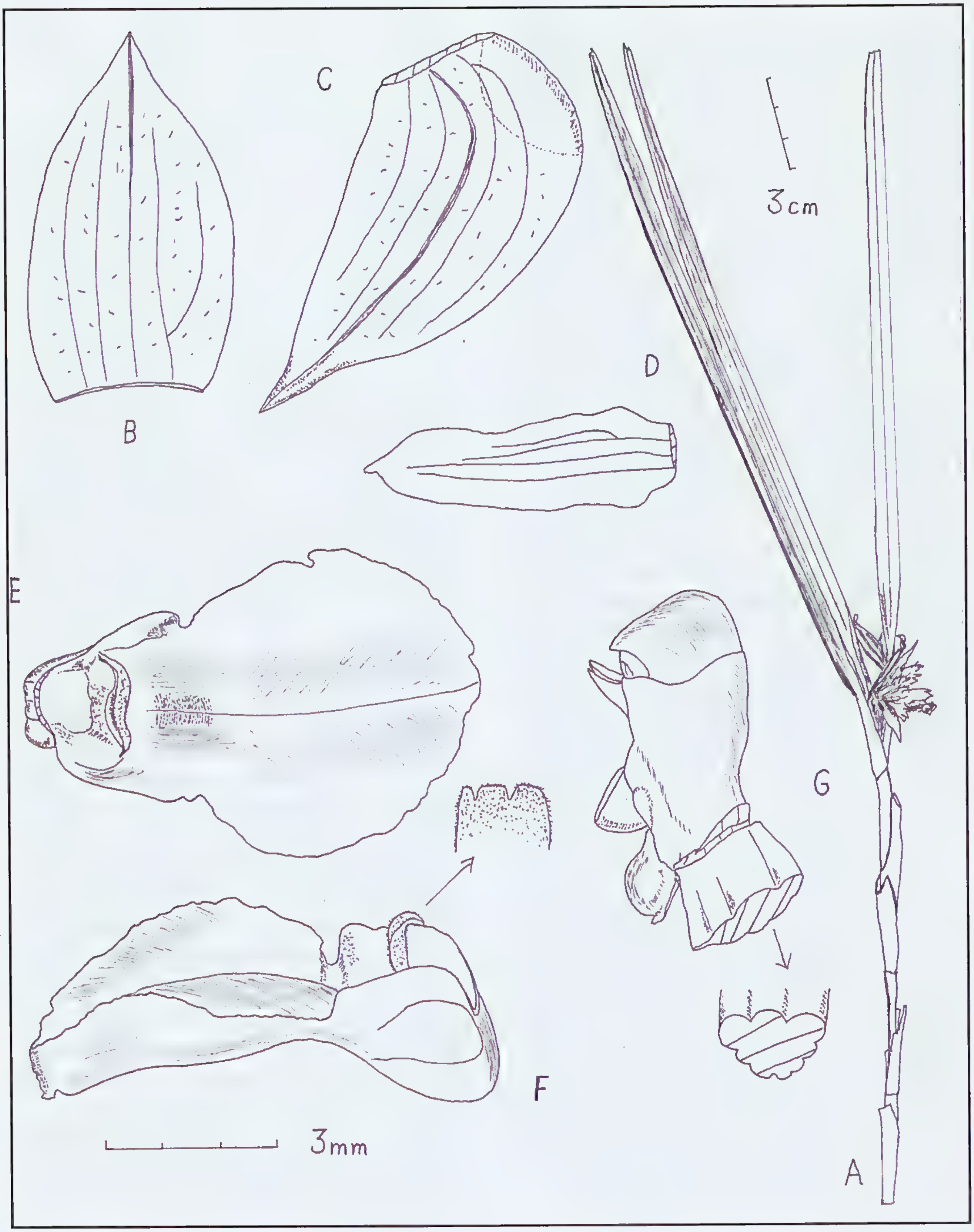
Dorsal sepal ovate, acute, midvein weakly carinate, 4-5 veined, 5.9 mm long, 3.8 mm wide. Lateral sepals obliquely ovate-elliptic, acute, midvein weakly carinate in apical quarter, 3 veined, one lateral vein branched, 8 mm long, 4.5 mm wide. Petals oblong-elliptic, obtuse, 5.5 mm long, 2.5 mm wide. Labellum trilobed, 8 mm long; hypochile spurred-saccate, sidelobes rounded truncate, 3.5 mm long, 2 mm wide dorsally; ligula subquadrate, bidentate, papillose-pubescent; epichile trilobulate, transversely elliptic, ca. 4.5 mm long, 6.3 mm wide, midlobule transversely oblong-elliptic, emarginate-bilobulate, ca. 0.9 mm long, 3 mm wide. Column stout, 2.7 mm long.

**Distribution:** Papua New Guinea.

**Habitat:** Low epiphyte in mossy forest, 2150 m.

**Etymology:** Named for the type locality, Mt. Dayman.

This species seems to approach *A. pelorioides* Schltr. but appears to differ



Agrostophyllum crassilabium - A. stem, B. dosal sepal; C. lateral sepal; D. petal; E. F. labellum (ligula arrowed); G. column. (ovary x-section arrowed). A and B-F to respective scales. Drawn from holotype.

in having longer (52.5 vs. 30 cm) stems, shorter (to 20 vs. 28 cm) leaves and a shorter (6.5 vs. 8 mm) pedicellate ovary.

***Agrostophyllum habbemense*** Ormerod, *sp. nov.*

Type: Indonesia – Papua Prov., 9 km NE of Lake Habbema, 2800 m, October 1938, *L.J. Brass 10599* (Holotype: AMES!; Isotype: BRI!).

Caule laxe foliatis, ad 44.7 cm longis, foliis anguste ligulatis, bidentatis, 47-70 mm longis, 2.5-3.0 mm latis, inflorescentiis 1-2 floris, tepala 8.1-10.5 mm longis, sepala 4.10-4.75 mm latis, petala 2.85 mm latis, labello trilobatis, 10.5 mm longis, epichilo subtrilobatis, subtrapeziformis, 7.5 mm longis, 8.9 mm latis, midlobula transverse oblongis, 3.0-3.3 mm longis, 6 mm latis.

Epiphytic herb. Roots terete, pubescent, 0.8-2.0 mm thick. Stems caespitose, covered with complanate sheaths, laxly foliose, 21.0-44.7 cm long, 0.25-0.35 cm thick. Leaves linear-ligulate, apex inequally bidentate, mucro short, 25-30 mm apart, 47-70 mm long, 2.5-3.0 mm wide, teeth of apex 1.0-2.5 mm long; leaf sheaths relatively long, oblique, often not black margined, turning yellowish to grey when old, persistent, exposed part 36-40 mm long, stipules deltate, acute to bidentate, 0.20-0.35 mm long. Inflorescence terminal, composed of bracts and sheaths, 1-2 flowered, ca. 15-18 mm long, 6-7 mm wide. Pedicellate ovary terete, 13 mm long. Flowers white, lip with a yellow patch at base of epichile. Dorsal sepal ovate-elliptic, subacute, 9.9 mm long, 4.1 mm wide. Lateral sepals obliquely ovate-elliptic, dorsally carinate apically, ca. 10.5 mm long, 4.75 mm wide. Petals irregularly oblong, subacute, 3 veined, 8.1 mm long, 2.85 mm wide. Labellum trilobed, 10.5 mm long; hypochile with low oblique sidelobes, medially with a small callus, ca. 3 mm long, 1.8 mm wide dorsally, 2.2 mm wide laterally; ligula subquadrate, shortly bidentate with an obtuse mucro, papillose-pubescent, raising ca. 1 mm above sidelobes; epichile subtrapeziform, broadly apiculate, ca. 7.5 mm long, 8.9 mm wide, midlobule transversely oblong, 3.0-3.3 mm long, 6 mm wide. Column ca. 4 mm long.

**Distribution:** Indonesia (Papua Prov.).

**Habitat:** Low epiphyte in forest of valley bottom, 2800 m.

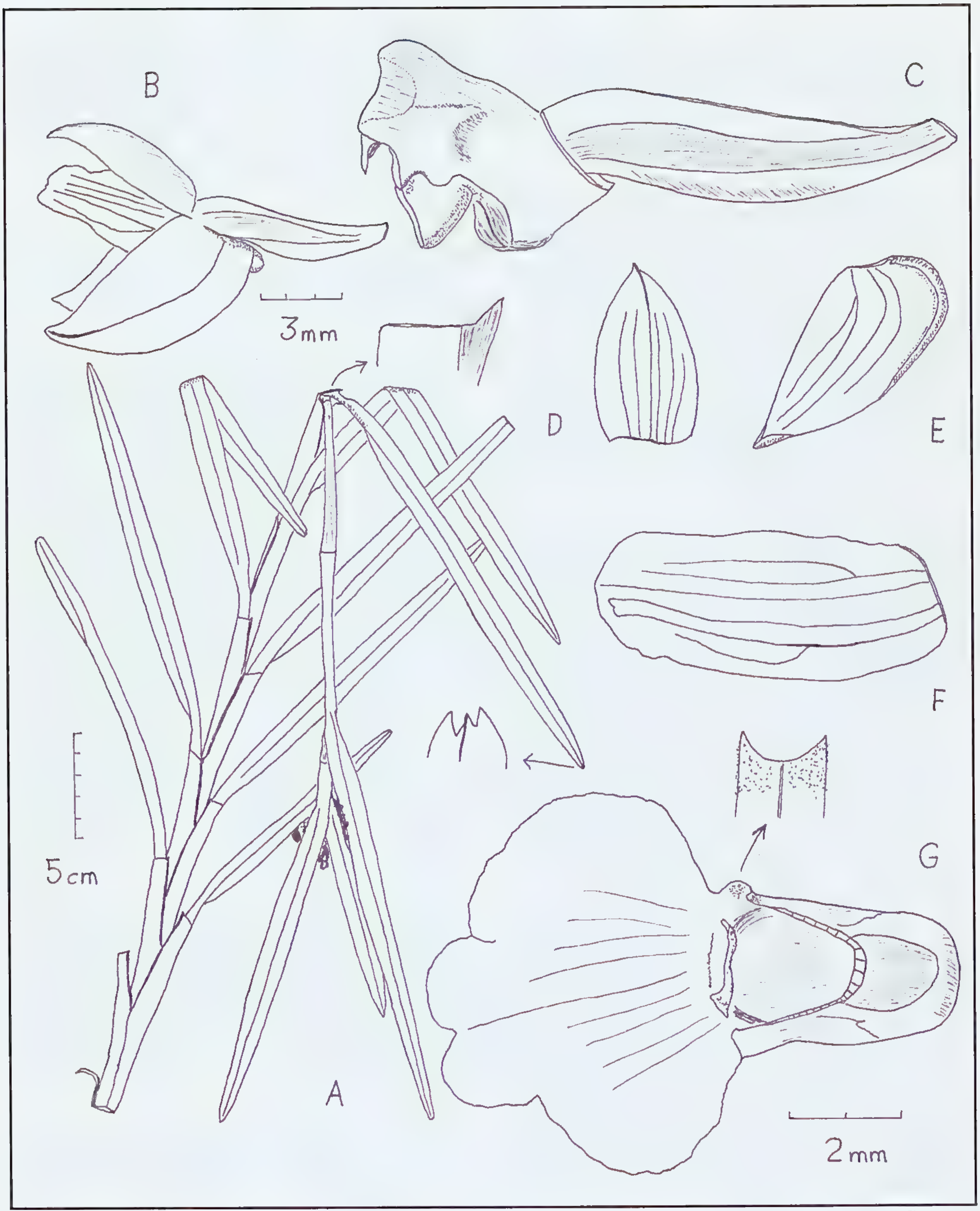
**Etymology:** Named after Lake Habbema, which is near the type locality. This species seems to lack close relatives. It may be recognised by its laxly leafy stems with flattened sheaths, short (to 70 mm long), narrow leaves, short leaf sheath stipules, 1-2 flowered inflorescences, relatively large flowers and a subtrapeziform labellum epichile with a transversely oblong midlobule.

***Agrostophyllum isuaravum*** Ormerod, *sp. nov.*

Type: Papua New Guinea – Central Prov., Isuarava, 1370 m, 26 February 1936, *C.E. Carr 10583* (Holotype: AMES!).

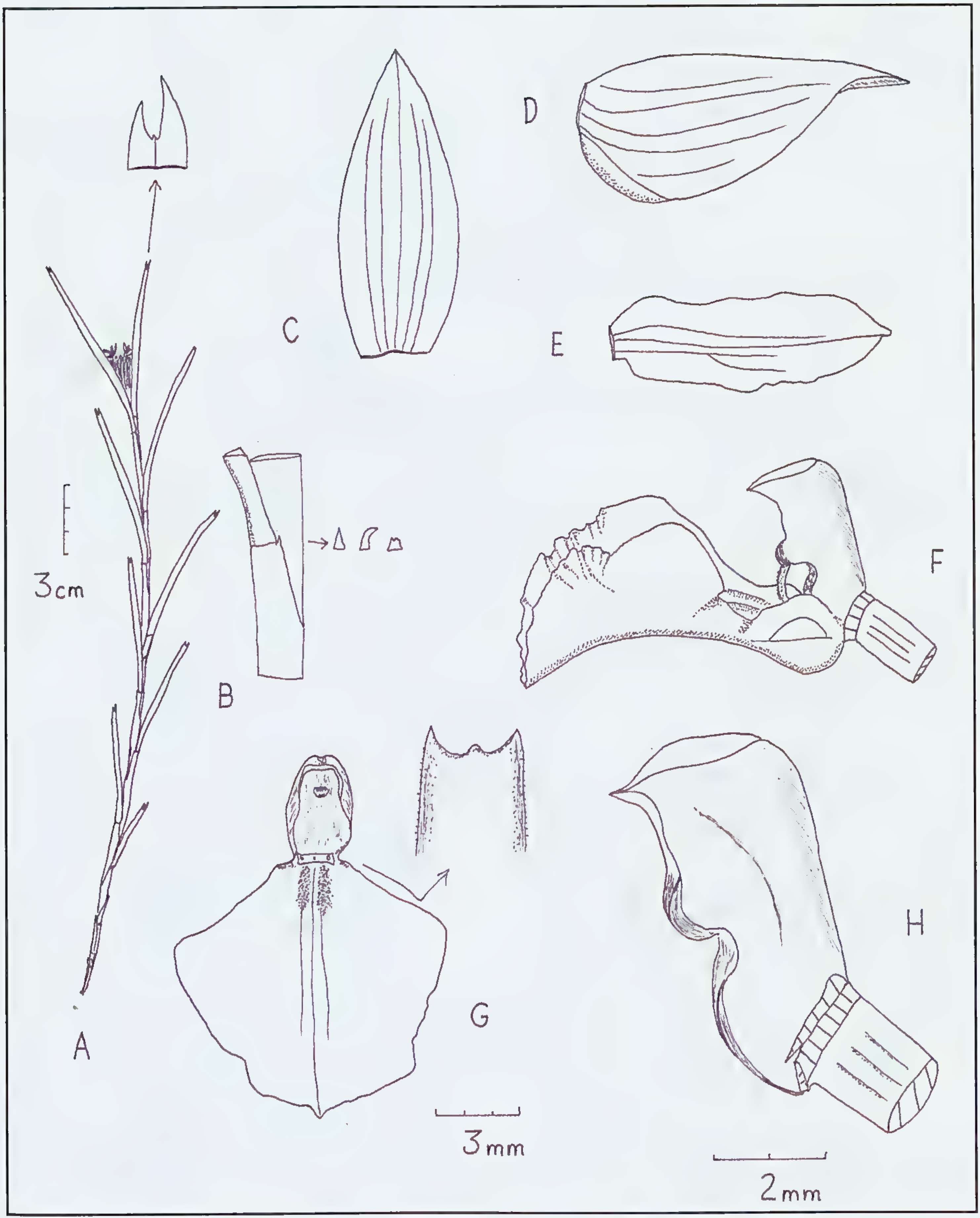
*Affinis A. papuanum* Schltr. *sed petalis floribus ovato-oblongis (non lanceolatis), hypochilo labello retrorso-saccatis (non recto-saccatis) et aliis columna humilideltatis (non dentato-flabellatis) differt.*

Epiphytic herb. Roots terete, pubescent, 1.2 mm thick. Stem covered by complanate leaf sheaths, sublaxly 11-leaved, 27 cm long, to 7 cm wide across sheaths. Leaves oblong to elliptic, minutely obtusely equally bilobed, base contracted, thinly coriaceous, 3.4-12.0 cm long, 2.3-3.6 cm wide; leaf sheaths oblong, complanate, obliquely truncate-rounded, often black-margined, 4-6 cm long, 1.5-2.0 cm wide. Inflorescence terminal, semiglobose, densely many-flowered, with numerous bracts and sheaths, ca. 3.4 cm wide. Pedicellate ovary 6-ribbed, 5 mm long. Flowers with pale yellowish sepals, petals and



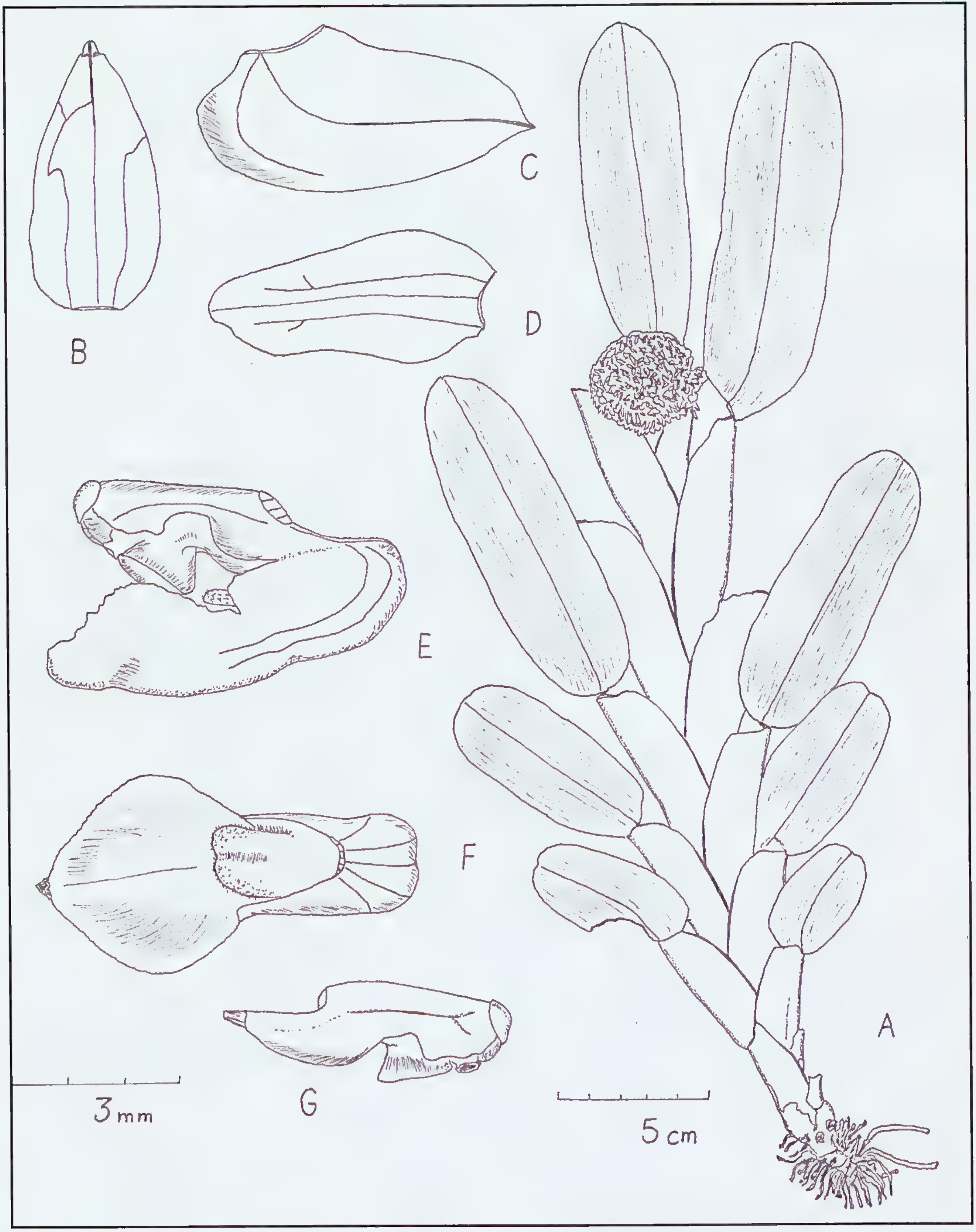
Agrostophyllum daymanense - A. stem (stipule and leaf tip arrowed); B. flower; C. column and ovary; D. dosal sepal; E. lateral sepal; F. petal; G. labellum (ligula arrowed); A,BDE and CFG. to respective scales. Drawn from holotype.

lip white, column pale yellow, anther cap pale brown. Dorsal sepal ovate-elliptic, subacute, weakly carinate near apex, 3 veined, 4.3 mm long, 2.3 mm wide. Lateral spas obliquely ovate-elliptic, acute, shortly connate basally, weakly carinate near apex, lower basal margin shallowly saccate, 5.7 mm long, 2.9 mm wide. Petals ovate-oblong, obtuse, 3 veined, 4.5 mm long, 2 mm



Agrostophyllum habbemense - A. stem (leaf tip arrowed); B. stem node (stipules arrowed); C. dosal sepal; D. lateral sepal; E. petal; F. flower minus tepals; G. labellum (ligula arrowed); H. column. A, C-G and H. to respective scales. B not to scale. Drawn from holotype.

wide. Labellum trilobed, ca. 6 mm long; hypochile 3 mm long, retrorse saccate, sac ca. 1 mm long, sidelobes broadly rounded, ca. 1.9 mm long, 1 mm wide; ligula subquadrate, emarginate, obliquely erect, papillose-pubescent; epichile suborbicular, apiculate, margins irregular dentate, ca. 3 mm long, 4 mm wide. Column with low deltate apical wings, medially with a large substigmatic



Agrostophyllum isuaravum - A. plant; B. dosal sepal; C. lateral sepal; D. petal; F. labellum G. column. A and B-G to respective scales. Drawn from holotype.

process, ca. 3 mm long; columnfoot retrorse, ca. 1.3 mm long.

**Distribution:** Papua New Guinea.

**Habitat:** Secondary forest, 1370 m.

**Etymology:** Named after the type locality, Isuarava.
This species resembles *A. papuanum* Schltr. in habit but differs from it in having flowers with ovate-oblong, obtuse (not lanceolate, acute) petals, a labellum with a retrorsely saccate (not globose, straight-backed) hypochile, and a column with low triangular, entire (not flabellate, dentate) column wings with a vertical (not oblique) base to the substigmatic process.

Literature Cited (see Part 2).

## RHS Registrations of Australian Hybrids

March and April 2011

| | | |
|---|---|---|
| ***Dendrobium*** | | |
| Brinawa Rose | Brinawa Sunset x Grarose | Down Under N.O. 2011 |
| Chloe Gee | Ronnie Gee x Rutherford Sunspot | Down Under N.O. 2011 |
| Jorja Fox | Peewee x Tie-Dye | Down Under N.O. 2011 |
| Katelin Todd | Tie-Dye x Jaffa | Down Under N.O. 2011 |
| Margaret Robson | Grace Robson x *bigibbum* | Down Under N.O. 2011 |
| ***Sarcochilus*** | | |
| Hargitay | Riverdene x Velvet | Down Under N.O. 2011 |
| Leanne | Sharon x Fitzhart | J.Woolf (L.Fagg) 2011 |

## Shows 2011

**ANOS (Qld) Kabi Group Inc.** Spring Show 27 & 28 August 2011 Lawnton Showgrounds, 757 Gympie Road, Lawnton Benching: from 2pm Friday 20 August & 7-9am Saturday Open Saturday 9am - 5pm, Open Sunday 8.30am - 2pm
Enquiries: 3285 2047 or 3289 1953
Adults: $3.00 Children under 12 - free

**ANOS CENTRAL COAST GROUP**
31st Annual Spring Show to be held in conjunction with the Australian Springtime Flora Festival in the grounds of Mt Penang Parklands, Kariong (entry via Kangoo Road) - Thursday 8th to Sunday 11th September 2011. Judging to commence from 7.00pm Wednesday 7th September.

10th Annual *Sarcochilus* Show to be held at Penrose Nursery & Aquarium Centre, 224 The Entrance Road (Central Coast Highway), Erina (entry via Penrose Crescent) - Saturday 15 and Sunday 16 October 2011. Judging to commence 9.00am on the Saturday. NOTE: this is a new venue.

**Native Orchid Society of Toowoomba.**
Spring Show to be held in September, 16th. - 20th. Daily Times: 9am-4.30pm
Venue: St John's Lutheran Church Hall
Venue Address: Bridge Street, Wilsonton Toowoomba (opposite Airport)
Entry charges - Adult: $3 .

**The Geelong ANOS**
Annual Show 2011
to be held at , the Geelong Masonic Centre
Regent St. Belmont , Geelong
on Sat, 5th & Sun. 6th November
from 10am - to - 4pm
Melways page 451 H10

# **DIRECTORY OF A.N.O.S. GROUPS** (& Associated Societies)

## NEW SOUTH WALES

- **ANOS Central Coast**, P.O. Box 3010, Erina 2250. (02) 4343-1809. Meetings 8pm, 2nd Wed. each month. Narara Community Centre, 2 Pandala Road, Narara. 2250
- **ANOS Far North Coast**, P.O. Box 949, Ballina 2478. (02) 6686-6303. Meetings 7.30pm, 3rd Fri. each month. C.W.A. Room, River Street, Ballina.
- **ANOS Illawarra**, 2 Wiford St, Corrimal, 2518. (02) 4284-8308. Meetings 7pm, 2nd Tue. each month. Figtree Community Hall, Figtree Park, Figtree.(next to Westfield Figtree Shopping Centre)
- **ANOS Macarthur & District**, 43 Strickland Cres, Ashcroft, 2168. (02) 46 818589. Meetings 8pm, 3rd Thur. each month. Narellan Community Hall, Queen St., Narellan.
- **ANOS Mid-North Coast**, 69 The Lakes Way, Forster 2428. (02) 6554-9733. Meetings 12 noon, last Sunday each month followes by BBQ. (Held at Taree or Wauchope - phone Secretary for details).
- **ANOS Newcastle**, P.O. Box 4021, Rathmines 2283. (02) 4975-3729. Meetings 7.30pm, 4th Thur. each month. John Young Community Hall, Thomas St, Cardiff.
- **ANOS Sydney**, 22 Rabaul Ave, Whalan. (02) 8824 6338. Meetings 8pm, 3rd Fri. each month. Senior Citizens Hall, Baulkham Hills Community Centre (off Conie Ave.) Baulkham Hills.
- **ANOS Warringah**, P.O. Box 421, Forestville 2087. (02) 9943 0474. Meetings 8pm, 3rd Tue. each month. Community Hall, Starkey St., Forestville.

## NEW ZEALAND

- **ANOS New Zealand Native Orchid Group**, 22 Orchard St., Wadestown, Wellington, New Zealand.
- **New Zealand Native Orchid Group**, 22 Orchard St., Wadestown, Wellington, New Zealand.

## QUEENSLAND

- **ANOS Beenleigh**, PO Box 1130 Beenleigh QLD, 4207. (07) 3841 3330. Meetings 7.30 1st Thursday each month Showground Hall, James St. Beenleigh.
- **ANOS Gold Coast**, P.O. Box 472, Biggera Waters Qld 4126. Meetings 1.30pm on the last Sunday of the month. Southport Community Centre, Lawson St, Southport.
- **ANOS Kabi**, PO Box 424, Aspley 4034. (07) 3359-5752 Meetings 7.30pm, 2nd Tue. each month (except Jan.). Bald Hills Memorial Hall, 2126 Gympie Rd., Bald Hills.
- **ANOS Mackay & Dist.**, PO Box 138, Koumala, 4738. (07) 4950-1065. Meetings 7.30pm, 2nd Thursday of each month at the Andergrove Community Centre, Celeber Drive, Andergrove.
- **ANOS Townsville**, 92 Curie St, Wulguru, 4811. (07) 4778-4311. Meetings 8pm, 1st Tue. each month. Townsville Orchid Society Hall Joe Kirwan Park cnr Bamford Lane and Charles Street Townsville..
- **Native Orchid Society of Toowoomba**, P.O. Box 2141,Toowoomba 4350. Meetings 7.30pm, 1st Fri. each month. Luthern Church Hall, Cnr. West and Alderly Sts, Toowoomba.

## SOUTH AUSTRALIA

- **Native Orchid Society of South Australia**, P.O. Box 565, Unley 5061. (08) 8294 8014. Meetings 8pm, 4th Tue. each month. St. Matthews Hall, 67 Bridge St., Kensington.

## VICTORIA

- **ANOS Geelong**, 2 Cooper St, Melton South 3338. (03) 9743 6040. Meetings 7.30pm, 2nd Wed. each month. Uniting Church Hall, Moorabool St., South Geelong.
- **ANOS Victoria**, P.O. Box 345, Carlton North 3054. (03) 9387-2771. Meetings 8pm, 1st Fri. each month. Meetings at the Toorak Uniting Church Hall, 603 Toorak Road, Toorak. (Melways 58, K4)
- **ANOS Melbourne Suburbs Group**, PO Box 169, Bayswater Vic. 3153. 0419720355. Meetings held on the 4th Wednesday of the month at 7.30pm at Montrose Primary School, Leith Rd., Montrose 3765 (Melways 52 D7)

## WESTERN AUSTRALIA

- **ANOS Western Australia**, 27 Maidment Parade Dalyellup WA, 6230. 041 9901 335. Meetings 8pm, 2nd Mon. each month. Wilson Community Hall, Braibrise Rd., Wilson.

# The Australasian Native Orchid Society Inc.

ABN 88 676 231 296
P.O. 318 Willoughby, N.S.W. 2068 AUSTRALIA.

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Ian Chalmers
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*Dendrobium* Aussie Starlight 'Wagga' ACE OSNSW - NSW Cultural Award of the Year

*D.* Blue Sparkle owned by Juergen & Kay Heindke

Photo Ros Capell